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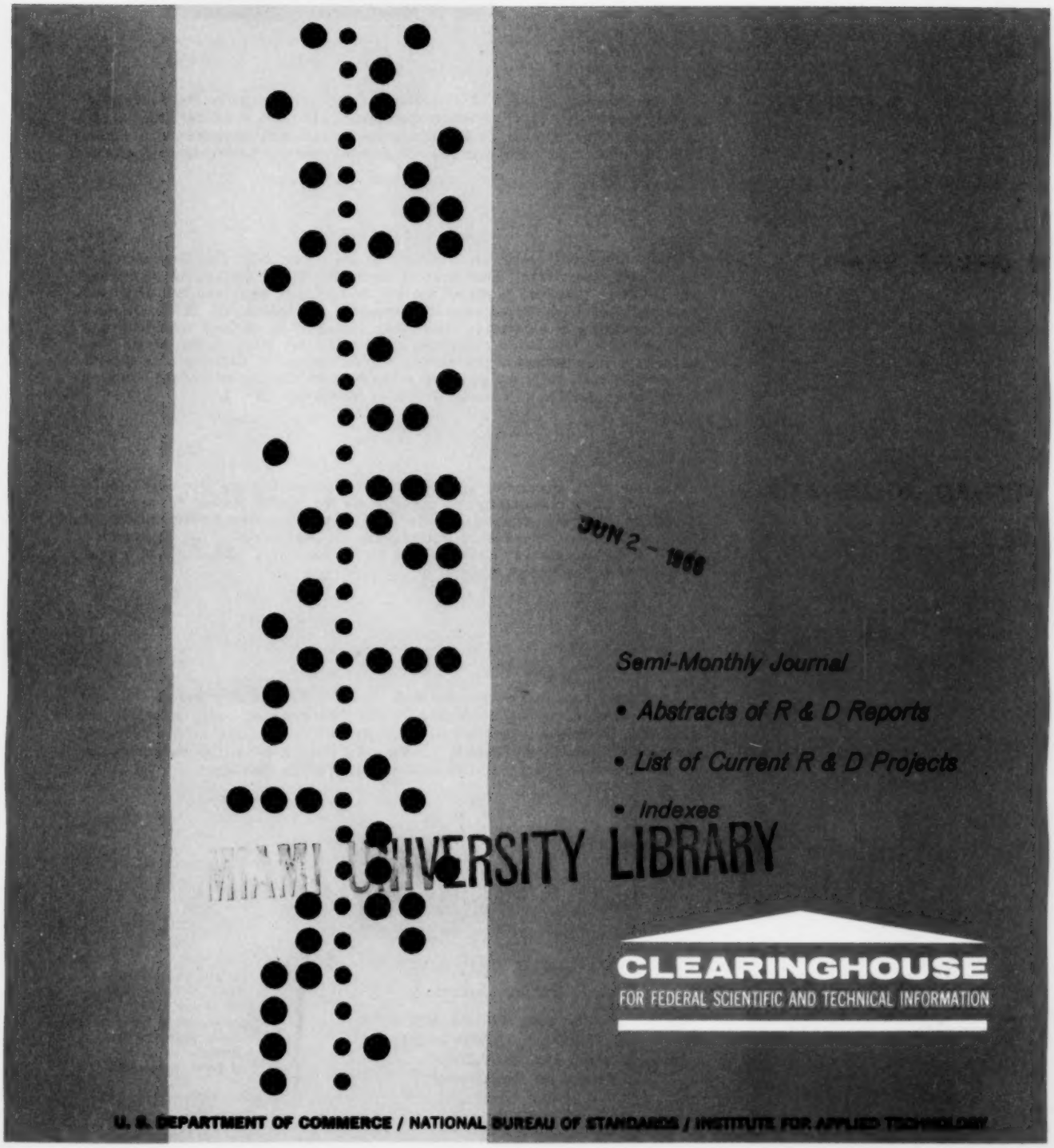
April 25, 1966

U.S. GOVERNMENT RESEARCH & DEVELOPMENT REPORTS



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April 25, 1966 / Volume 41, Number 8

U.S. Government

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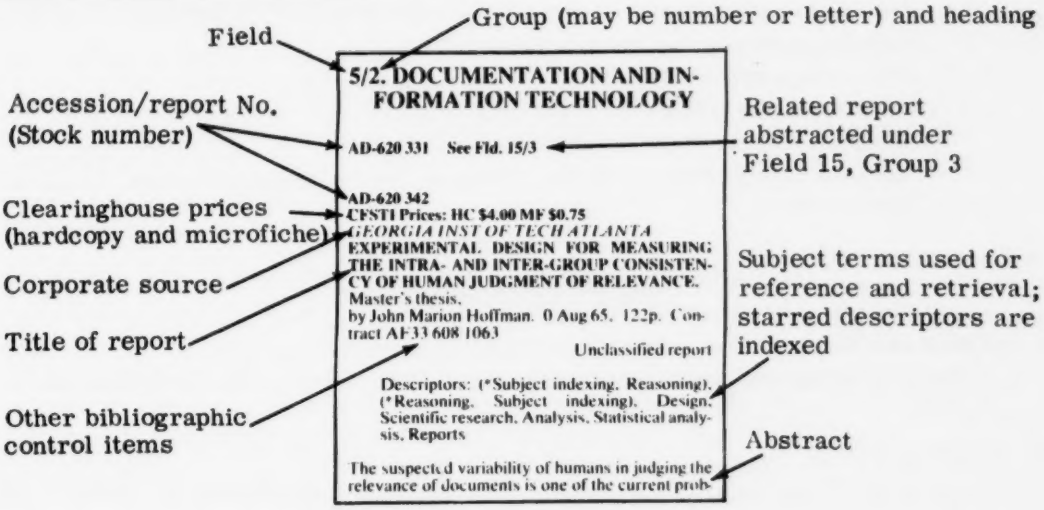
- TECHNICAL ABSTRACT BULLETIN
- OTHER RESEARCH REPORTS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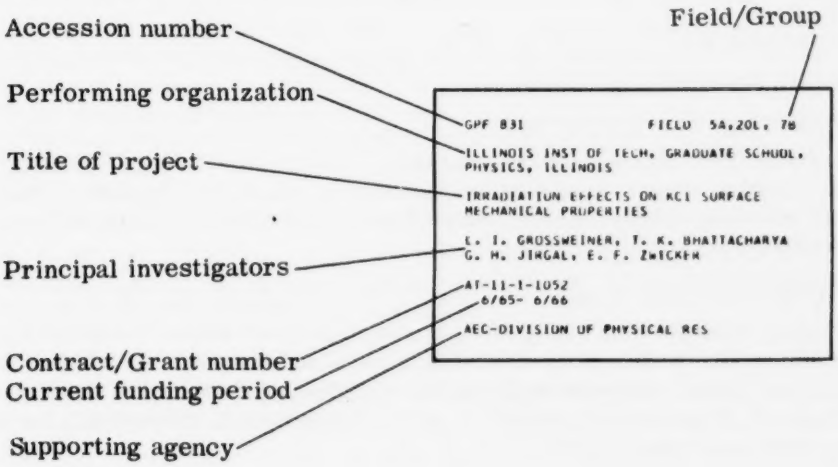

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Indexes – Subject, Personal Author, Corporate Source, Contract Number, Accession/Report Number.

SUBJECT CATEGORY HEADINGS

01 AERONAUTICS 1, S-1
Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE 2
Includes agricultural chemistry; agricultural economics; agricultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 3, S-1
Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 5, S-1
Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 11, S-3
Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 19, S-6
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07 CHEMISTRY 34, S-8
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08 EARTH SCIENCES AND OCEANOGRAPHY 48, S-11
Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING 53, S-11
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10 ENERGY CONVERSION (Non-Propulsive) 61, S-14
Includes conversion techniques; power sources; and energy storage.

11 MATERIALS 63, S-15
Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 67, S-18
Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 74, S-18
Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction epuipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT 78, S-19
Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES 80
Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 81, S-21
Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 82, S-22
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18 NUCLEAR SCIENCE AND TECHNOLOGY 86, S-23
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19 ORDNANCE 88, S–26
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20 PHYSICS 90, S–26
Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS 116, S–33
Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY 118, S–34
Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

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Chemicals

HANDLING HAZARDOUS FUELS AND OXIDIZERS

(Order Stock No. N65-35394 Handling Hazardous Materials, HC $0.45/ MF $0.75.)

A survey of techniques for handling hazardous fuels and oxidizers has been prepared for the National Aeronautics and Space Administration. The report covers liquid hydrogen, pentaborane, liquid fluorine, chlorine trifluoride, ozone, nitrogen tetroxide, and hydrazine compounds. The compilers note that at one time mention of some of these fuels and oxidizers was frightening to chemical and ground support equipment designers, but because safe handling techniques have now been developed by the Department of Defense and NASA, commercial application of these materials is more likely. Dynamic handling as employed in the survey embraces the complex matters of transporting, transferring, mixing of materials, etc. -- all the handling functions as the material is drawn from its storage facility to the point where it is introduced into a vehicle. The new oxidizers often present more problems than the fuels because the oxidizers are extremely reactive substances. Ozone, for example, is potentially attractive for use in fuel systems but techniques to cope with its tremendous instability have not yet been mastered. In many other instances, however, both oxidizer and fuel handling techniques have been worked out and can be adapted by those in civilian technology for commercial application of these substances.

Communications

NASA HANDBOOK SURVEYS MAGNETIC TAPE RECORDING

(Order Stock No. N66-14159 Magnetic Tape Recording, HC $1.25/MF $1.75.)

A Space Agency survey of magnetic tape recording describes the development of tape recorder technology for use in airborne and ground-based systems. Prepared by Dr. Skipwith W. Athey, the 326-page publication notes that aerospace contributions to magnetic tape recording are of considerable value to civilian technologists in several fields, including computers and telemetry. Individual chapters in the survey review recording methods, head-tape interaction, tape moving systems, disturbances to tape motion, tape recorder head structure and function, magnetic tape, and recorder electronics. The remaining chapters discuss tape recorder mechanical components, methods of testing and evaluating tape and recorders, miniature high-environment recorders, complete recording systems, and use factors in magnetic recording.

Management Control, Decision Systems

RAND REPORT AIMS AT IMPROVED MAINTENANCE MANAGEMENT

(Order Stock No. AD-627 448 Unifying Resource Allocation, Control, and Data Generation: An Approach to Improved Base-Level Maintenance Management, HC $3.00/MF $0.50.)

RAND Corporation has completed a report aimed at the development of management concepts and techniques for dealing with short-run and long-run allocation and control problems. A National Bureau of Standards evaluator terms the work "an excellent paper of general use to operations research and information analysts, and of specific value to maintenance management." The RAND study describes a unified information system designed to support both short-run and long-run maintenance resource allocation. It emphasizes the value of an event-dominated, event-centered, or action-reporting information system. These terms denote a system by which reports of events important to management control are furnished by the most knowledgeable sources and are recorded on consolidated (integrated) records as they occur.

TRANSFER OF AEROSPACE SKILLS TO PUBLIC PROJECTS UNLIKELY

(Order Stock No. AD-628 544 Transferability of Research and Development Skills in the Aerospace Industry, HC $4.00/MF $1.00.)

A report prepared by Analytic Services, Inc., concludes that the transfer of scientific and engineering skills from the aerospace industry to other fields of public concern is unlikely. ANSER scrutinized studies made by aerospace contractors for the State of California. These studies looked at the feasibility of transferring aerospace R and D capabilities to stimulate diversification in other fields and, at the same time, to solve some of the State's difficult and long-standing problems. The ANSER reports terms the California studies inconclusive and says the largest group of scientists and engineers in the industry--those engaged in design and development--may well be the least transferrable. The report adds that in the next five years it is unlikely that civilian-public projects will become a significant part of the industry's business.

NYLON AND CHOPPED WIRE IN CEMENT INCREASES FLEXURAL STRENGTH

(Order Stock No. AD-465 999 Fibrous Reinforcements for Portland Cement Concrete, HC $4.00/MF $0.75.)

Nylon fibers and chopped wire used as random reinforcements in portland cement concrete significantly increase flexural strength. They are effective in resisting tensile and compressive spalling or fragmenting generated by impact loading, and they impart good energy-absorption characteristics. The U. S. Corps of Engineers made these findings in tests conducted using nylon monofilament in 3/4" lengths and .017 steel wire in 1-1/2" lengths. They found that the 28-day ultimate flexural strength can be increased 1.5 times that of plain concrete with the use of the nylon and over 2.5 times by the use of chopped wire. Their R and D report describes the types of aggregate mixes used in the study, the optimum spacing of the random reinforcements, the estimated costs per cubic yard of concrete, and tables of flexural strength vs. percent of a variety of fiber materials.

FIBER-REINFORCED CONCRETE SHOWS FRAGMENTATION DECREASED

(Order Stock No. AD-627 889 Response of Fibrous-Reinforced Concrete to Explosive Loading, HC $3.00/MF $0.75.)

Explosive loading tests on fiber-reinforced concrete show an 80 percent reduction in fragmentation and a 20 percent reduction in velocities as compared to conventionally reinforced concrete. This Army Corps of Engineers study, continuing work on the preceding report, included 72 tests on concrete slabs 32x32x4 inches using a 10-pound cylindrical charge of Composition B high explosive. The reinforcing fibers producing the best results were 15-Denier by 3/4-inch long nylon and .017 by 1-1/2-inch long steel wire. The report notes that only a slight difference in response to explosive loading should be expected between basic high-strength and moderate-strength concretes when they are fibrous-reinforced.

RIGID SULPHUR FOAM PROCESSED IN FIELD

(Order Stock No. AD-628 064 Development of Equipment and Procedures for Producing Large Quantities of Foamed Sulphur in the Field, HC $1.00/MF $0.50.)

The first practical process and equipment for producing large quantities of rigid sulphur foam has been developed by the Southwest Research Institute. "This new foam material," says the SRI development report, "represents a significant advance in the field of foam technology and has applications that measurably exceed the use intended." The three-year Air Force-sponsored study was for a new material for shock-isolating large underground structures. The SRI work demonstrated that foamed sulphur can indeed be produced on a continuous basis at a remote field site by a process and with equipment that is simple and capable of being scaled up to any size. The foam has a density of 27 lb/ft^3, a compressive strength of 130 psi, a constant strain rate deformation to 65-70 percent, and a low water absorption. The cost of the raw materials for these sulphur foams is less than two cents per pound, and a 27 lb/ft^3 density foam can be produced from readily available commercial chemicals for only 54 cents per cubic foot. The rigid urethane foams with similar physical properties cost approximately $3.00 per cubic foot.

Fuels

MICROORGANISMS THRIVE IN N-ALKANE FUEL

(Order Stock No. AD-628 673 Effects of Selected Strains of Micro-organisms on the Composition of Fuels and Lubricants, HC $5.00/MF $1.00.)

In tests of 36 jet fuels, including JP-4 and JP-6, subjected to infestation by 21 kinds of aerobic bacterial and fungal microorganisms, Monsanto Research Corp. found that the microorganisms show a preference for fuels with n-alkanes as a source of carbon. This conclusion is supported by observation that jet fuel samples derived from the kerosene fraction of petroleum contain relatively high concentrations of n-alkanes and support good growth of these microorganisms. Deliberate removal of all n-alkanes from the jet fuel samples, on the other hand, results in a significant decrease in their growth-supporting properties. However, the investigators caution that there may also be present in the fuel secondary growth-supporting components such as the series of 2-methyl- and 2,2-dimethyl-alkanes. Also, high-temperature fuels in general support much more growth than thermally stable fuels. One jet fuel sample known as A-33 is resistant to attack by all the bacterial and fungalcultures.

Information Technology

INFORMATION SYSTEMS AID ECONOMIC PLANNERS

(Order Stock No. AD-628 213 Economic Development Planning and Information Systems: A Discussion and Bibliography, HC $3.00/MF $0.75.)

Information systems can be of great assistance to economic development planners, concludes System Development Corp. They have recently completed a study devoted to applications of computer-based information systems that includes a bibliography of recent literature on the economics of development planning. With the computer, SDC reports, the context of economic planning problems can be looked at with more completeness and accuracy. Criteria can be established for information significance in economic planning problems. Concerning efficiency, the computer enables planners to follow the overall economic planning processes and to routinize certain aspects of it. However, timesaving is probably the greatest advantage of computer-based information processing.

SCANDINAVIAN RESEARCH GUIDE UPDATED

(Order Stock No. PB-169 113 Scandinavian Research Guide, HC $10.00/MF $2.00.)

Over the past 5 years, the research effort in science and technology has increased considerably, organization changes have occurred, and new research projects have replaced concluded ones in Scandinavia. Accordingly, the outdated 1960 edition of the Scandinavian Research Guide has been completely revised. Descriptions of the 1,440 institutions have been revised, and the format and physical arrangement of the directory have been changed to simplify the location of information of interest to the user. New features include an introductory survey of the organization of scientific and industrial research in the five Scandinavian countries. The following types of institutions have been included in the Guide: governmental, semigovernmental, cooperative institutions, private laboratories which undertake contract work for others, scientific societies, and information services.

BATTELLE COMPILES DATA ON STRUCTURE AND PROPERTIES OF PLUTONIUM

(Order Stock No. BNWL-37 Plutonium Metallurgy Notebook, HC $6.00/MF $1.25.)

A notebook on plutonium metallurgy prepared by Battelle-Northwest is a compilation of data on the structure and properties of plutonium and its alloys. The document includes phase diagrams, crystal structure data, transformation kinetics, physical and mechanical properties, corrosion and corrosive properties, and radiation effects information. Battelle obtained the data from reports, books, and journals. When the results reported by two or more laboratories differ, the most recent data from each laboratory is included. Tentative or uncertain results are given only when positive information is not available. The information is current to September 1964. The report is divided into three major sections: unalloyed plutonium, binary alloys, and ternary alloys.

DYNAMIC TENSILE DATA OBTAINED ON VARIETY OF ALLOYS

(Order Stock No. UCRL-14599 The Effect of Strain Rate on Mechanical Properties of Some Widely Used Engineering Metals, HC $2.00/MF $0.50.)

The effect of strain rate on the mechanical properties of some widely used engineering materials has been studied by Lawrence Radiation Laboratory using the model 600 Dynapak metalworking machine. Dynamic tensile data were obtained at strain rates up to 200 in./in./sec and at temperatures from 75 to 900°F. The report of the study also presents dynamic data from other sources at strain rates as high as 9000 in./in./sec. Static data were obtained on a universal test machine at strain rates of 10^{-5} to 10^{-1} in./in./sec. Several theories on mathematical relationships between stress and strain are examined and evaluated in terms of experimental data. The materials studied included 4330 vanadium-modified steel, CVM Vascomax-300, titanium alloys, aluminum alloys, tantalum, and a tungsten alloy.

BETTER METHOD FOR PREDICTING BRITTLE FAILURE CONDITIONS

(Order Stock No. WAPD-TM-505 Fracture Mechanics: A Basis for Brittle Fracture Prevention, HC $3.00/MF $0.75.)

A Westinghouse report says the relationships between stress state, defect geometry, elastic constants, and fracture toughness employed in applied fracture mechanics can be used to predict brittle failure conditions in a more quantitative manner than transition temperature concepts. In addition, Westinghouse says the fracture mechanics parameter (plane strain fracture toughness) appears to provide a measure of the fracture resistance of metals. Plane strain fracture toughness can be measured using laboratory fracture tests and applied to components. The report discusses central problems and limitations of experimental fracture mechanics, surveys the role of defects in components with respect to the relationships between stress fields, defect geometry, and material condition and reviews basic aspects of ultrasonic testing.

Electronics

WELDED CORDWOOD MODULES FABRICATED CHEAP AND FAST

(Order Stock No. N66-16572 A Fast and Economical Technique for Welded Cordwood Electronic Module Fabrication, HC $1.00/MF $0.50.)

A faster, more economical technique for the fabrication of welded cordwood modules has been developed by NASA's Lewis Research Center. Lewis says the technique is considerably less expensive than those previously used and should be useful for commercial applications where cost is a major factor. It is extremely flexible and requires no special jigs, fixtures, or potting molds and a minimum of layout time. The technique uses a molded plastic preform which retains the components during welding. The preform adds mechanical strength to the unencapsulated circuit and provides a means of centering and holding it in a conventional potting shell.

NASA REVIEW EMPHASIZES SILICON INTEGRATED DEVICES

(Order Stock No. N66-10414 Microelectronics in Space Research, HC $0.60/MF $1.00.)

The National Aeronautics and Space Administration has published a review of the contributions made by space research programs to the microelectronics field which appear to be useful for general industrial application. It places emphasis on silicon integrated device technology because of its relatively large importance. Microelectronics is defined by the review as those technologies by which circuit functions are realized in inseparable solid structures which duplicate the behavior of collections of conventional lumped parameter components. This eliminates from consideration microminiaturization aimed solely at size reduction of components and circuits. The publication begins with a review of microelectronics and discusses thick films, thin films, silicon integrated devices, and general device considerations. It then moves into technology and techniques, device design and development, and reliability, and concludes with a variety of applications in space systems. NASA says that much of the application information being generated can be of value to other users of microelectronic devices.

Lubricants

BARRIER LUBRICATING TECHNIQUE EXTENDS BEARING LIFE TENFOLD

(Order Stock No. AD-627 345 A New Approach to Lubricating Ball Bearings, HC $1.00/MF $0.50.)

A barrier lubricating film technique developed by the Naval Research Laboratory corrects a flaw in silicone lubricating oils and brings about a tenfold increase in life expectancy of such things as synchros and servo motors. The Navy also says the new system can be valuable for other types of equipment. The barrier film has the ability to confine sufficient silicone fluid within the bearings to minimize the incidence of boundary lubrication. An examination of failed bearings, most of which had been lubricated with silicone oils, revealed much evidence of fretting corrosion, badly worn and broken ball retainers, dry residues, and lack of visible lubricant. The silicones, used because of their excellent low-temperature viscometric properties, low volatility, and high-temperature stability, tend to creep away from critical bearing areas during service and also while the synchros are in storage. Since the bearings cannot be relubricated in the field, boundary lubrication conditions soon prevail, the silicones are unable to lubricate adequately, and a short bearing life results.

Data Processing

ANALOG GENERATOR FORMS ROTATED CUBICS AND CONICS

(Order Stock No. AD-623 945 Analog Generator for Real-Time Display of Curves, HC $2.00/MF $0.50.)

A low-cost analog generator capable of forming rotated cubics and conics for real-time display on a cathode-ray tube has been designed by the Massachusetts Institute of Technology. Presently in operation on the TX-2 computer at MIT's Lincoln Laboratory, the generator has an accuracy of 0.1 percent and is capable of producing over 3000 arbitrary curves per second. MIT says that for most applications, where one is merely inspecting a drawing for content and topology and not taking dimensions off with a pair of dividers, the 0.1 percent accuracy of an analog curve drawing generator is entirely sufficient. The generator uses high-bandwidth, high-power operational amplifiers and high-current field-effect transistors (FET) in the analog switches for fast and accurate operation. The advent of the high-current FET provides, for the first time, analog switching speeds in the microsecond region with no current or voltage offset. Because of its high current range, the FET can switch bipolar currents up to 2 ma at constant impedance.

Chemical Processing

OXYGEN IN ALKALI METALS DETERMINED USING GLOVEBOX VESSEL

(Order Stock No. ANL-7123 Glovebox Amalgamation for the Determination of Oxygen in Alkali Metals, HC $1.00/MF $0.50.)

A new type of amalgamation vessel for the determination of oxygen in sodium and potassium is in use at the Argonne National Laboratory. The technique developed by Argonne yields generally lower and more reproducible values in the low-ppm range than do the older vacuum-line amalgamation procedures. The metal is amalgamated immediately after sampling inside a helium-filled glovebox, thereby terminating the risk of significant oxygen contamination by subsequent handling and exposure to the glovebox atmosphere. Endpoint sensitivity is enhanced by titrating the oxide residue in the same vessel, thus avoiding dilution by wash water that would be required in the transfer to a titration flask.

FLUORIDE SEPARATED BY PYROHYDROLYTIC-COLORIMETRIC METHOD

(Order Stock No. DP-1004 Determination of Fluoride by Pyrohydrolysis and Automated Colorimetry, HC $1.00/MF $0.50.)

A pyrohydrolytic-colorimetric method has been developed by the Savannah River Laboratory for determining trace as well as macro quantities of fluoride in solid and liquid samples. In relatively pure fluoride solutions, Savannah says 0.050 micro-g/ml is detectable by an automated colorimetric method based on the blue complex formed between fluoride and the lanthanum chelate of alizarin complexone. A precision of 0.6 percent can be obtained at the 0.3 micro-g/ml level with standard sodium fluoride solutions. With samples containing uranium, aluminum, zirconium, and other interfering cations, fluoride is separated by pyrohydrolysis with superheated steam enriched with oxygen. It is absorbed in a solution of sodium hydroxide and is then measured by the automated colorimetric method.

NEW FIELD OF REACTIONS OF DIFLUORAMINO RADICALS OPENED

(Order Stock No. AD-627 816 Reactions of Free Radicals Containing Nitrogen, HC $1.00/MF $0.50.)

A completely new field of reactions of difluoramino radicals has been opened up at the Edward Davies Chemical Laboratory, Aberystwyth, Wales. According to the program report of this Air Force-sponsored study, the work has developed "some exciting new chemistry on the kinetics of the difluoramino radical that is simply derived from the dissociation of tetrafluorohydrazine." In addition, the kinetics of the addition of tetrafluorohydrazine have now been completely worked out and data found for a wide range of unsaturated compounds. "The work is of great interest," the Davies report continues, "because the diamines formed are not only new compounds but kinetics can be investigated more exhaustively and precisely than is possible for any other addition system. The difluoramine radical is almost unique from the point of view of quantitative kinetic studies since its concentration can be measured with a manometer." Previous to the present study, results had been reported on the thermodynamic properties of two free radicals containing nitrogen and on the kinetics of some four hydrogen transfer reactions that could have involved the breaking of an N-H bond. The Davies work established the heats of formation of the amino, methylamino, and dimethylamino radicals to within an error limit of about plus or minus 2 kcal. mole $^{-1}$. This contrasts with previous estimates that differed by about 20 kcal. mole $^{-1}$. Furthermore, the trend in the N-H bond strengths with methyl substitution has been clearly established. The trend, says the report, is very similar to that found in the alkyl radicals and good grounds therefore are now available on which to base the deduction of parallels from the sets of C-H and N-H bonds.

Transportation (Land, Sea, Air, Space)

SHIP WEIGHT CLASSIFICATION BOOKLET UPDATED

(Order Stock No. PB-169 239 Classification of Weights -- Standard Grouping for Merchant Ships, HC $2.00/MF $0.50.)

The Maritime Administration, U. S. Department of Commerce, has updated its "Classification of Weights -- Standard Grouping for Merchant Ships." First published in 1940 and revised in 1962, the publication had been out of print for some time. However, it is to be used in conjunction with PB-168 691 "Standard Specifications for Cargo Ship Construction," price HC $11.70/MF $4.00, issued late in 1965 by the Maritime Administration. The "Standard Specification," which is designed to decrease shipbuilding costs by promoting use of standard ship components, includes as part of the requirements for calculating ships' weight and center of gravity the use of forms and information in the "Classification of Weights." The classification plan consists of three major groupings: steel, outfit, and machinery. Summary forms for reporting weights of the various items are illustrated. There is a detailed, cross-referenced index which generally encompasses by common name every item of equipment and material found on a modern merchant vessel. Each item is assigned to a classification group, so that weight calculations for each item, on which the lightweight tonnage of the ship is based, will be reported on a uniform basis.

HIGHWAY ENGINEERING CONFERENCE EMPHASIZES ELECTRONICS

(Order Stock No. PB-169 406 Conference on Improved Highway Engineering Productivity, Proceedings, HC $8.85/MF $2.50.)

This 584-page reference contains papers on data procurement and display, progress in highway management and communication systems, and the use of electronics in highway transportation. The Conference also covered traffic simulation and surveillance and control, computer applications and programming, electronics in financial and administrative management, and a new totally integrated engineering system developed by the U. S. Bureau of Public Roads. The purpose of this three-day conference was to discuss electronics in highway transportation as applied to highway engineering, administration, and communications. Representatives of the U. S. Bureau of Public Roads, Massachusetts Institute of Technology, and State highway departments, as well as other research organizations and industry presented papers and participated in panel discussions. The new program of the Bureau of Public Roads for nationwide research and development covers all aspects of highway engineering, coordinated and integrated through maximum use of communication systems, photogrammetry, electronic computers, and associated devices.

Nuclear Technology

NEUTRON ACTIVATION ANALYSIS PROMISING FOR CRIME DETECTION

(Order Stock No. GA-6152 Use of Neutron Activation Analysis in Scientific Crime Detection, HC $3.00/MF $0.75.)

Neutron activation analysis is a promising tool for crime detection. Law enforcement officers who fight the criminal from their scientific laboratories believe it will be in ever-expanding use. According to a General Dynamics report of work undertaken in cooperation with the Los Angeles Police Department, neutron activation analysis uses high neutron fluxes to activate various biological and nonbiological samples which are then analyzed radiochemically. The purpose is to analyze samples such as hair, paint, paper, and other materials possibly connected with a crime by purely instrumental means to determine if the samples of the same type of material from different sources can be characterized by their elemental composition. This includes both major and minor constituents and, more important, trace element impurities. Instrumental neutron activation analysis has several advantages over other analytical laboratory techniques such as emission spectroscopy. For most elements it is more sensitive, thus allowing more elements to be detected in the samples, and smaller samples to be analyzed. An important advantage in criminalistics is that the samples can be analyzed by purely instrumental means: the sample is not destroyed but is preserved for future presentation in court. Finally, in some cases neutron activation analysis is much more accurate. The General Dynamics study devised a method of showing the comparison of samples in a manner which is easily visualized by nonscientists, such as members of a jury. It allows the presentation of analytical results in court in a nonmathematical manner that is still scientifically sound. This involves the comparison of gamma-ray spectra of activated samples by plotting the normalized spectra of two or more samples on the same graph paper.

AEC'S PROCESS RADIATION PROGRAM SUMMARIZED

(Order Stock No. BNL-949-(C-47) Process Radiation Development Program Summaries, Fifth Annual Contractors Meeting, Oct. 7-8, 1965, HC $4.00/MF $0.75.)

The Proceedings of the 5th Annual Contractors Meeting on Process Radiation Development held at Brookhaven National Laboratory contain several papers on radiation processed wood-plastic combinations. Other papers treat the radiation chemistry of fluorocarbons and radiation synthesis of fluorine compounds, semiconductor device fabrication by neutron transmutation techniques, radiation chemical reactor design, the pressure Co^{60} gamma-radiation-induced polymerization and the design of radiation chemical reactors. Also included are papers on the effects of nuclear radiation on optical maser materials, the industrial application of ionizing radiation to colloid systems, and radiation-induced polymerization and copolymerization of unusual monomers. AEC's Process Radiation Program, according to the introduction, has had an exciting year, with several projects reaching the status of impending commercialization.

TEMPERATURE MONITOR IS SPEEDY AND ACCURATE

(Order Stock No. DP-944 Description of a Temperature Monitor for Large Reactors, HC $2.00/MF $0.50.)

Speed, accuracy, and reliability are features of a temperature monitor developed by Savannah River Laboratory for continuous monitoring of reactor coolants. The system has the capability of handling 2,496 coolant channels. It can scan large numbers of the thermocouples at the rate of 24,960 per second to gain and process information. It incorporates extensive digital logic to provide readouts and temperature alarms plus self-normalization and self-checking capabilities. Two different input commutators have been successfully used with the prototype system developed and operated -- one consisting of 104 pairs of single pole relays and the other of 104 transistor switches -- but Savannah says it favors the transistor switching system.

NUCLEAR REACTOR-MHD POWER STATIONS EVALUATED

(Order Stock No. LA-3368 Nuclear Reactor Magnetohydrodynamic Power Generation, HC $3.00/MF $0.50.)

Now that very high temperature, gas-cooled nuclear reactors for rocket application have been achieved, and in view of progress in the development of MHD electrical power generation, it is compelling to consider a merger of the two as as a useful power source. Los Alamos Scientific Laboratory has completed such a study, confined to large commercial power stations, that evaluates envisioned reactor-MHD plants, and compares these with other nuclear power plants. Although Los Alamos says it will not at present plan for a low-power MHD experimental reactor or MHD reactor loop test, the Laboratory concludes that a reactor probably can be developed for such a very high-temperature inert-gas-cooled application. Refractory metal reactors, though less well known, appear to have a better potential for providing gas at temperatures up to 2500°K. The Los Alamos study examines areas where special problems may exist, the feasibility of the development of various components, and the relative capital and fuel cycle costs. Assuming that all the components can be developed, Los Alamos says power plants with efficiencies of 50 to 60 percent will result.

POWER-WATER NUCLEAR PLANT CHEAPER THAN FOSSIL-FUEL

(Order Stock No. TID-22330 Engineering and Economic Feasibility Study for a Combination Nuclear Power and Desalting Plant: Vol. I, Phases I and II, HC $4.00/MF $2.50; Vol. II, Phase III, HC $4.00/MF $3.00; Vol. III, Summary, HC $1.25/MF $1.50.)

A large combination nuclear power and desalting plant can produce 150 million gallons of water per day cheaper than a comparable gas-oil fired plant, according to a Bechtel Corporation study. Their recently completed study of Southern California sites made for the Atomic Energy Commission and Office of Saline Water shows that desalted water can be produced for as little as 21.9 cents per 1000 gallons -- more than one-third less than the estimated 33 cent cost of a fossil-fired plant of similar capacity. Furthermore, the nuclear plant can produce power for 3.05 mills per kilowatt-hour as compared to 4.05 mills for a comparable gas-oil fired plant. Bechtel's final report on the dual-purpose plant gives a detailed analysis of the selected plant and site to confirm technical feasibility, to validate costs, and to provide a breakdown of the cost of producing desalted water.

An earlier report deals with preliminary engineering and economic work, including a survey of possible sites, means for introducing desalted water into the system, and a survey of the potential market for sale or exchange of excess electric power. It reports on the extensive engineering and economic studies designed to determine the proper size and type of water plant, power plant, and plant location. A third publication of the completed Bechtel study summarizes the significant results of the work, including general background information on preliminary planning, site and plant analysis, facility description, and a breakdown of total investment costs.

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CURRENT research & development PROJECTS

01. Aeronautics

GSE 731 FIELD 13F,20K

RENSSELAER POLYTC INST, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, NEW YORK

MODES OF AERODYNAMIC SUSPENSION

J. V. FOA

NSF-GK-618
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

03. Astronomy and Astrophysics

34 41 1 FIELD 13B, 3A

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

CONDUCT STUDIES OF LUNAR SOIL MECHANICS, INCLUDING THE DETERMINATION OF STATIC MECHANICAL PROPERTIES

E. VEY
NAS4-NASR-65-02-E-4
7/63-12/64

NASA

34 103 2 FIELD 3A

BOSTON UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

A STUDY OF LUNAR CRATERS AND THEIR RELATION TO METEORITES AND ASTEROIDS

S. S. HAWKINS
NASA-NSG-246-SI-.
6/64- 5/65

NASA

GQF 259238 FIELD 3A

GRAD RES CTR OF S-WEST, TEXAS

THEORETICAL STUDY OF THE EFFECT OF THE INTERPLANETARY MAGNETIC FIELD ON PROPAGATION OF COSMIC RADIATION

K. G. MCCRACKEN
AF-19-628-05028
/65- /

DOD-AIR FORCE

GQF 259243 FIELD 3A, 3B

UNIV OF MANCHESTER, UNITED KINGDOM

PERFORMANCE OF PHOTOGRAPHIC AND SPECTOGRAPHIC OBSERVATIONS AT PIC-DU-MIDI OBSERVATORY

Z. KOPAL
AF-61-052-00882
/65- /

DOD-AIR FORCE

GQF 259245 FIELD 3A, 4A,20H

UNIV OF UPPSALA, SWEDEN

RESEARCH DIRECTED TOWARD THE EVALUATION OF HIGH LATITUDE COSMIC RAY DATA

A. E. SANDSTROM

AF-61-052-00868
/65- /

DOD-AIR FORCE

GQF 259264 FIELD 3A, 3B

INST GEOFISICO HNCAYO, PERU

THEORETICAL + EXPERIMENTAL STUDIES OF CENTIMETER EMISSIONS FROM THE SOLAR DISC AND CORONA

A. GIESECKE
/65- /

DOD-AIR FORCE

GQF 259334 FIELD 3A, 3B, 9+, 9A

SMYTHE RESEARCH ASSOC, SAN DIEGO, CALIFORNIA

PROCUREMENT OF EQUATORIAL CONVERT OR ANTENNA PROGRAM SYSTEM

. NONE

AF-19-628-05225
/65- /

DOD-AIR FORCE

GQF 259344 FIELD 3A, 3B, 4A

OBSERVATORY DE PARIS, FRANCE

STUDY OF ASTRONOMICAL SEEING DISTURBANCES AND METHOD OF ELIMINATING IN ASTRONOMICAL PHOTOGRAPHY

A. DOLLFUS

AF-61-052-00873
/65- /

DOD-AIR FORCE

GQF 259348 FIELD 3A

BOLING CO SEATTLE, WASHINGTON

STUDY OF LUNAR SURFACE DURING LUNAR ECLIPSE OF DECEMBER 1964

R. W. SHORTHILL

AF-19-628-04371
/65- /

DOD-AIR FORCE

GQF 259404 5 FIELD 3A, 3B

UNIV OF MANCHESTER, UNITED KINGDOM

CONDUCT SPECTOGRAPHIC OBSERVATIONS OF THE LUNAR SURFACE IN THE VISIBLE REGION

Z. KOPAL
/65- /

DOD-AIR FORCE

GQF 259410 FIELD 3A, 3B

UNIV OF HAMBURG, GERMANY

RESEARCH ON GALACTIC NEBULAE EMPLOYING LIQUID DYE FILTERS WITH NARROW PASS BANDS

K. WURM

AF-61-052-00810
/65- /

DOD-AIR FORCE

GQF 260105 FIELD 3A, 3B, 9+,12A

SOLAR INSTRUMENTS

J. W. EVANS
/65- /

DOD-AIR FORCE

ZBA 712 FIELD 3A

USDC, NATL BUR STAN, BOULDER, COLORADO

STUDIES OF THE SOLAR ATMOSPHERE

R. N. THOMAS

AF-PRO-64-541
/64- /

COMMERCE-NATIONAL BUREAU OF STANDARDS

ZQF 260006 FIELD 3B, 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

RADAR ASTRONOMY

H. E. WHITNEY
/65- /

DOD-AIR FORCE

ZQF 260190 FIELD 13B, 3A, 3B,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

PLANETARY GEOMETRY

D. H. ECKHARDT
/65- /

DOD-AIR FORCE

ZQF 260193 FIELD 3C, 3A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ASTRODYNAMIC CONSTANTS

M. S. HUNT
/65- /

DOD-AIR FORCE

ZQF 260195 FIELD 3A, 3B, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

LUNAR LASER EXPERIMENTS

R. L. ILIFF
/65- /

DOD-AIR FORCE

ZQF 260196 FIELD 3A, 3B, 8F

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

GEOMETRIC TECHNIQUES
/65- /
T. E. WIRTANEN
DOD-AIR FORCE

04. Atmospheric Sciences

7GX 350 3

UNIV OF WASHINGTON, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WASHINGTON

INFLUENCE OF AEROSOL CHARACTERISTICS ON VISIBILITY

A. T. ROSSANO, R. F. PUESCHEL

7-AP-00336-03
9/65- 8/66

PHS-BSS

GH 1607 FIELD 4A,20J

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

ROCKET STUDIES OF THE LOWER IONOSPHERE DURING THE IQSY

S. A. BOWHILL, R. L. APPEL, K. G. BALMAIN G. W. HENRY, G. G. KLEIMAN, P. STICHA
/65- /

NASA

GPE 57 6 1 FIELD 4A

CSIRO, EAST MELBOURNE, AUSTRALIA

PROJECT HIBAL

E. J. HERBERT, E. A. CURWOOD, L. HARRIS

AT-49-7-1908
10/64- 9/65

AEC-BIOLOGY + MEDICINE

GQF 259099 1 FIELD 4A, 8+, 9+

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, TEXAS

RESEARCH + STUDY OF ELECTROMAGNETIC PHENOMENA OBSERVED IN EARTH CURRENTS AT .001 TO 5 CPS

A. W. STRAITON

AF-19-628-04046
/65- /

DOD-AIR FORCE

GQF 259305

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, GEOPHYSICAL SCIENCES, ILLINOIS

STUDY OF MESOMETEOROLOGICAL ENVIRONMENT AND CONVECTIVE CLOUD ACTIVITY

T. FUJITA

AF-19-628-04807
/65- /

DOD-AIR FORCE

GQF 259432 FIELD 20M, 4A, 7B

FLORIDA STATE UNIV, GRADUATE SCHOOL, METEOROLOGY, FLORIDA

STUDY OF STRATOSPHERIC MOTIONS AND VERTICAL OZONE DISTRIBUTION

R. A. CRAIG

AF-19-628-04953
/65- /

DOD-AIR FORCE

GQF 259555 FIELD 4A,20J

MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

STUDY OF ATMOSPHERIC ABSORPTION PROCESSES OF INFRARED RADIATION

R. C. LORD

AF-19-628-04343
/65- /

DOD-AIR FORCE

GQF 259643 FIELD 20M, 4A,20F

STUDY INFLUENCE OF GAS PROPERTIES ON IR TRANSMISSION + DEVELOP NEW OPTICAL METHODS OF ATMOS PROBING

D. G. WILLIAMS

AF-19-628-04315
/65- /

DOD-AIR FORCE

GQF 259681 FIELD 4A,20J,20F

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, PHYSICS + ASTROPHYSICS, COLORADO

ROCKET EXPMTS TO DETERMINE ATMOSPHERIC CONSTITUENTS IN EARTHS UPPER ATMOSPHERE

W. A. RENSE

AF-19-628-04961
/65- /

DOD-AIR FORCE

GQF 259758 2 FIELD 4A

DARTMOUTH COLLEGE, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW HAMPSHIRE

OPER ALL SKY CAMERA-RIOMETER SITES IN NORTHERN MAINE-KNOB LAKE CANADA-HANOVER NH

M. G. MORGAN

AF-19-628-02441
/65- /

DOD-AIR FORCE

GQF 259792 1 FIELD 3A, 4A

UNIV OF PUERTO RICO, GRADUATE SCHOOL, PUERTO RICO

STUDY INOSPHERIC STRUCTURE AND DRIFTS BY MEANS OF EXTRATERREST RADIO NOISE SURFACES

B. DUENO

AF-19-628-03991
/65- /

DOD-AIR FORCE

GUW 363 FIELD 8H,12A, 8E

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

ANALYSIS AND STATISTICAL STUDIES OF PRECIPITATION DATA

C. K. STIDD

INT-WR-B-998-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 365 FIELD 8H

COLORADO STATE UNIV, GRADUATE SCHOOL, ATMOSPHERIC SCIENCE, COLORADO

ATMOSPHERIC WATER

H. RIEHL, L. O. GRANT, J. R. RASMUSSEN

INT-WR-A-004-COLO
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

ZQF 260023 FIELD 4A, 8+, 9+,12A

IONOSPHERIC STRUCTURE

K. TOMAN
/65- /

DOD-AIR FORCE

ZQF 260026 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

AIRBORNE IONOSPHERIC STUDIES

G. J. GASSMANN
/65- /

DOD-AIR FORCE

ZQF 260033 FIELD 4A,20A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

WAVE MOTIONS IN THE UPPER ATMOSPHERE

T. D. CONLEY
/65- /

DOD-AIR FORCE

ZQF 260042 FIELD 8+, 9+, 9A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

DIRECT SENSOR TECHNIQUES

J. F. MORRISSEY
/65- /

DOD-AIR FORCE

ZQF 260045 FIELD 8+, 9A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

SENSING ELEMENTS

J. F. MORRISSEY
/65- /

DOD-AIR FORCE

ZQF 260050 FIELD 9C, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INDIRECT PROBING TECHNIQUES

W. H. PAULSEN
/65- /

DOD-AIR FORCE

ZQF 260054 FIELD 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

NEW CONCEPTS IN INDIRECT PROBING

K. M. GLOVER
/65- /

DOD-AIR FORCE

ZQF 260055 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

COMPOSITION MEASUREMENTS

R. S. NARCISI
/65- /

DOD-AIR FORCE

ZQF 260083 FIELD 3A, 4A, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

9+,12A

SOLAR WIND STUDIES

D. J. KNECHT
/65- /

DOD-AIR FORCE

ZQF 260084

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

WARM FOG AND STRATUS DISSIPATION

B. A. SILVERMAN
/65- /

DOD-AIR FORCE

ZQF 260108

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

MICROMETEOROLOGY OF FOG

W. P. ELLIOTT
/65- /

DOD-AIR FORCE

ZQF 260115 FIELD 4A, 7B

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

AURORAL MORPHOLOGY

S. SILVERMAN
/65- /

DOD-AIR FORCE

ZQF 260116 FIELD 4A, 7B

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

SPECTROGRAPHIC INVESTIGATIONS

S. SILVERMAN

/65- /

DOD-AIR FORCE

ZQF 260117 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

STUDIES OF IONOSPHERIC INVIRONMENT

W. PFISTER

/65- /

DOD-AIR FORCE

ZQF 260118 FIELD 4A, 8+, 9+, 9A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

DYNAMIC VARIATIONS

T. J. KENESHEA

/65- /

DOD-AIR FORCE

ZQF 260119 FIELD 4A, 9C, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ROCKET IONOSPHERIC MEASUREMENTS

J. C. ULWICK

/65- /

DOD-AIR FORCE

ZQF 260120 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

SATELLITE IONOSPHERIC MEASUREMENTS

J. C. ULWICK

/65- /

DOD-AIR FORCE

ZQF 260124 FIELD 4A,20J

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

HIGH ALTITUDE INFRARED

L. ELTERMAN

/65- /

DOD-AIR FORCE

ZQF 260126 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INFRARED ATMOSPHERIC BACKGROUND RADIATION

P. R. GAST

/65- /

DOD-AIR FORCE

ZQF 260127 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

TRAPPED RADIATION

L. KATZ

/65- /

DOD-AIR FORCE

ZQF 260130 FIELD 3A, 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

COSMIC RELATIONSHIPS

L. KATZ

/65- /

DOD-AIR FORCE

ZQF 260131 FIELD 3A, 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

GROUND OBSERVATIONS

L. KATZ

/65- /

DOD-AIR FORCE

ZQF 260143 FIELD 4A,20F

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INFRARED ENVIRONMENTAL STUDIES

J. S. GARING

/65- /

DOD-AIR FORCE

ZQF 260151 FIELD 3A, 4A, 7B

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ATMOSPHERIC PHYSICS

W. SWIDER

/65- /

DOD-AIR FORCE

ZQF 260154 FIELD 4A,12A, 9D, 8E

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

IONOSPHERIC STUDIES

W. PFISTER

/65- /

DOD-AIR FORCE

ZQF 260162 FIELD 3A, 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

CHARGE DENSITIES

R. C. SAGALYN
/65- /

DOD-AIR FORCE

ZQF 260165

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

CLOUD STRUCTURE AND DYNAMICS

R. M. CUNNINGHAM
/65- /

DOD-AIR FORCE

ZQF 260167 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ELECTROMAGNETIC PROPERTIES OF THE ATMOSPHERE

D. ATLAS
/65- /

DOD-AIR FORCE

ZQF 260168

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

MODEL CLOUD STUDIES

M. GLASS
/65- /

DOD-AIR FORCE

ZQF 260180 FIELD 4A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS
STRATOSPHERIC CIRCULATIONS
H. S. MUENCH
/65- /

DOD-AIR FORCE

ZQF 260183 FIELD 4A, 7B

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

CLEAR AIR TURBULENCE

S. PENN
/65- /

DOD-AIR FORCE

05. Behavioral and Social Sciences

GH 206 3 FIELD 9+

RESEARCH TRIANGLE IN, NORTH CAROLINA

RESEARCH FOR AN ABSTRACTING AND REVIEW SERVICE FOR TECHNICAL LITERATURE ON RELIABILITY FOR SCIENTISTS AND ENGINEERS

G. M. COX

NASA-NASR-40-M
6/64- 5/65

NASA

GH 311 2 FIELD 4A

AMER ACAD ARTS SCIENCE, MASSACHUSETTS

STUDY OF LONG-RANGE NATIONAL PROBLEM RELATED TO THE DEVELOPMENT OF THE NASA PROGRAM

E. STEVENSON

NASA-NSG-253-S
4/64- 8/64

NASA

GQF 260408 FIELD 12A

EMMANUEL COLLEGE, UNDERGRADUATE SCHOOL, MASSACHUSETTS

FOR AFCRL TRANSLATION SERVICES

. NONE

AF-19-628-05073
/65- /

DOD-AIR FORCE

GUW 357 FIELD 8H,12A, 8E

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

NEVADA RESOURCES DATA CENTER

G. B. MAXEY

INT-WR-A-010-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

06. Biological and Medical Sciences

GPE 493 2 FIELD 7D, 8D, 8H, 8C

YALE UNIVERSITY, GRADUATE SCHOOL, BIOLOGY, CONNECTICUT

STUDY OF LIGHT ISOTOPES IN LACUSTRINE ENVIRONMENTS

M. STUIVER, E. S. DEEVEY, M. *. STUIVER

AT(30-1)3204
6/65- 3/66

AEC-BIOLOGY + MEDICINE

GQF 259014 2 FIELD 9+,12A

EXPER INVEST OF WAVE PROP PROCESSES IN ACTIVE GRANULAR MATS FOR PATTERN RECOGNITION CAPABILITIES

H. MIRANDA

AF-19-628-02485
/65- /

DOD-AIR FORCE

ZPE 1143 FIELD 6B, 9+, 9A

US, AEC, OPER OFFICE, NEW YORK

DEVELOPMENTAL STUDIES IN INSTRUMENTATION

R. T. GRAVESON, M. E. CASSIDY, J. J. FREY V. NEGRO

/66- /

AEC-BIOLOGY + MEDICINE

07. Chemistry

1AI 3095 7 FIELD 7C, 7A, 7D,20J

HAMLINE UNIVERSITY, UNDERGRADUATE SCHOOL, CHEMISTRY, MINNESOTA

CHEMISTRY OF GLUCOSYLAMINES

O. RUNQUIST

12/65-11/66

PHS-NIH-NATL INST ALLERGY + INFECT DIS

1GM 7239 6 FIELD 7C, 7D,20J

DARTMOUTH COLLEGE, GRADUATE SCHOOL, CHEMISTRY, NEW HAMPSHIRE

OPTICAL ROTATORY DISPERSION STUDIES OF ORGANIC BASES

G. G. LYLE, C. AVUNDUK, M. DURAND M. PIAZZA

10/65- 9/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

1HE 5266 6 FIELD 7C, 7D

WORCESTER FOUNDATION, MASSACHUSETTS

AZASTEROIDS

M. GUT

9/65- 8/66

PHS-NIH-NATL HEART INST

GPF 28 2 FIELD 7D,20J,20I, 7B

UNIV OF WISCONSIN, GRADUATE SCHOOL, CHEMISTRY, WISCONSIN

ATOMIC AND MOLECULAR BEAM STUDIES

R. B. BERNSTEIN, R. J. BEUHLER R. W. BICKES, M. E. GERSH, K. T. GILLEN C. RILEY, W. K. SIPFLE

AT-11-1-1328
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 318 4 FIELD 7C, 7D, 7A,20M

WAYNE STATE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, MICHIGAN

ELECTRON PARAMAGNETIC RESONANCE STUDIES OF RADIATION EFFECTS IN SOLIDS AND CHEMICAL COMPOUNDS

Y. W. KIM, R. A. ANDREWS, C. L. ASELTINE K. VANDERLUGT, R. F. WENZEL

AT-11-1-1054
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 490 3 FIELD 7C, 7A, 7D, 7B

NORTHWESTERN UNIV, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

THE USE OF CARBON -14 IN THE STUDY OF CATALYZED REACTIONS OF HYDROCARBONS AND ALCOHOLS

H. PINES, M. ABRAMOVICI, C. T. GOETSCHEL N. C. SIH

AT-11-1-1096
9/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 503 3 FIELD 7C, 7D, 7B

UNIVERSITY OF KANSAS, GRADUATE SCHOOL, CHEMISTRY, KANSAS

SOME PROBLEMS IN THE CHEMISTRY OF TRANSITION METALS

E. GRISWOLD, J. A. BASFORD, J. KLEINBERG J. REINSTEIN

AT-11-1-1099
9/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 712 1 FIELD 20M, 5A,18A,20D

LOYOLA UNIVERSITY, GRADUATE SCHOOL, PHYSICS, LOUISIANA

ELECTRON SPIN RESONANCE AND OPTICAL ABSORPTION IN COMPACTED SILICA

D. G. KEIFFER

AT(40-1)-3303
11/65-10/66

AEC-DIVISION OF PHYSICAL RES

GUE 17 1 FIELD 7D, 8H, 7B

ASTROPOWER INC, NEWPORT BEACH, CALIFORNIA

INVESTIGATION OF INORGANIC ION EXCHANGE MEMBRANES FOR ELECTRODIALYSIS APPLICATION

C. BERGER, J. A. BITTLES, G. MOE M. J. PLIZGA

1/65-12/65

INTERIOR-OFFICE OF SALINE WATER

GUE 103 1 FIELD 7A, 7D,20M,20J

UNIFIED SCIENCE ASSOC, PASADENA, CALIFORNIA

RESEARCH ON ROLE OF LIGAND MOLECULES ON IONIZATION POTENTIALS

S. NAIDITCH, . WILLIAMS

/66- /

INTERIOR-OFFICE OF SALINE WATER

ZNE 62 1 FIELD 7D

USN, OFF NAV RES, NAV RES LAB, DIST OF COLUMBIA

COORDINATION CHEMISTRY

D. VENEZKY

NR-052-463
9/64- 8/65

NAVY-OFFICE NAVAL RESEARCH

08. Earth Sciences and Oceanography

GPE 609 3 FIELD 8D, 8G, 7B

DARTMOUTH COLLEGE, GRADUATE SCHOOL, GEOLOGY, NEW HAMPSHIRE

THERMOLUMINESCENT RADIATION DOSIMETRY OF NATURALLY OCCURRING MATERIALS

N. M. JOHNSON

AT(30-1)2982
6/65- 5/66

AEC-BIOLOGY + MEDICINE

GPE 712 3 FIELD 13G, 8G, 8C,20D

UNIV OF WASHINGTON, GRADUATE SCHOOL, OCEANOGRAPHY, WASHINGTON

BOTTOM CURRENTS AND THE MOVEMENT OF SEDIMENT ACROSS THE CONTINENTAL SHELF

J. S. CREAGER, R. W. STERNBERG

AT(45-1)1752
6/65- 5/66

AEC-BIOLOGY + MEDICINE

GPF 49 3 FIELD 3A, 7D, 8D, 8G

UNIV OF KENTUCKY, GRADUATE SCHOOL, CHEMISTRY, KENTUCKY

RADIOCHEMISTRY AS APPLIED TO GEOCHEMICAL PROBLEMS - NEUTRON ACTIVATION ANALYSIS

W. D. EHMANN

AT(40-1)-2670
1/66-12/66

AEC-DIVISION OF PHYSICAL RES

GPF 483 4 FIELD 8D, 8G, 7B

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, GEOCHRONOLOGY, ARIZONA

CORRELATION AND CHRONOLOGY OF ORE DEPOSITS AND VOLCANIC ROCKS

P. E. DAMON, R. BENNETT, A. W. LAUGHLIN D. E. LIVINGSTON, R. L. MAUGER, S. TITLEY

AT-11-1-689
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 711 4 FIELD 8D, 8G, 7B

WASHINGTON UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MISSOURI

GEOLOGIC DATING OF CORALS AND OTHER CALCAREOUS MATERIALS

H. A. POTRATZ, M. H. CHENG

AT(11-1)-581
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 718 3 FIELD 7D, 8D, 8G,18A

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, ENGINEERING PHYSICS, NEW YORK

NEUTRON ACTIVATION ANALYSIS STUDIES OF IRON METEORITES

D. E. FISHER

AT(30-1)-2794
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GQF 259497 3 FIELD 8F, 8G, 8H

UNIV OF TORONTO, GRADUATE SCHOOL, CANADA

RESEARCH NECESSARY FOR THE PREPARATION + PUBLICATION OF A DESCRIPTION OF EARTHS CRUST

J. J. WILSON

AF-19-628-00222
/65- /

DOD-AIR FORCE

GQF 259498 3 FIELD 8G, 8K, 8+, 9+

PENNSYLVANIA ST UNIV, SCHOOL OF MINERAL IND, MEDICAL TECHNOL + HLTH, PENNSYLVANIA

RESEARCH ON DETERMINATION OF DEPTH OF FOCUS OF A SEISMIC EVENT

B. F. HOWELL

AF-19-628-00238
/65- /

DOD-AIR FORCE

GQF 259500 3 FIELD 8K, 8G

UNIV OF RHODE ISLAND, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, RHODE ISLAND

THEORETICAL + MODEL STUDIES OF SEISMIC WAVE PROPOGATION IN PRESENCE OF CRUSTAL DISCONTINUITIES

J. KANE

AF-19-628-00319
/65- /

DOD-AIR FORCE

GQF 259509 2 FIELD 8N, 8K, 8G

UNIV OF ALBERTA, GRADUATE SCHOOL, CANADA

INVESTIGATE EARTHS CRUST IN WESTERN CANADA EAST OF ROCKY MNS BY SEISMIC REFRACTION METHODS

G. L. CUMMING

AF-19-628-02835
/65- /

DOD-AIR FORCE

GQF 259520 FIELD 8D, 8K,12A, 8E

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

STUDY OF SEISMIC WAVES OF LONG AND INTERMEDIATE PERIOD

W. M. EWING

AF-19-628-04082
/65- /

DOD-AIR FORCE

GQF 259528 4 FIELD 8D, 8K, 8E,12A

WEIZMANN INST OF SCI, ISRAEL

THEORETICAL SEISMOLOGY

C. L. PEKERIS

AF-61-052-00841
/65- /

DOD-AIR FORCE

GQF 259534 1 FIELD 8D, 8K, 8G

UNIV OF FRANKFURT, GERMANY

INVESTIGATION OF THE DYNAMIC PROCESS IN SHALLOW AND DEEP EARTHQUAKE FOCI

H. BERCKHEMER

AF-61-052-00801
/65- /

DOD-AIR FORCE

GSB 2947 6 FIELD 8D, 8G

DUKE UNIVERSITY, GRADUATE SCHOOL, ZOOLOGY, NORTH CAROLINA

PLEISTOCENE ENVIRONMENTAL CHANGES IN EAST AFRICA

D. A. LIVINGSTONE, S. S. CAVALIERE R. L. KENDALL

NSF-GB-3567
1/65- 1/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

GSB 3007 FIELD 8D, 8G

LOUISIANA ST UNIV A+M, GRADUATE SCHOOL, GEOLOGY, LOUISIANA

ORDOVICIAN BRACHIOPODS FROM THE CAPE - F ERNVALE LIMESTONE

H. J. HOWE

NSF-GB-3778
5/65- 5/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

GSB 4282 FIELD 8D

UNIV OF MINNESOTA, GRADUATE SCHOOL, BOTANY, MINNESOTA

UPPER CRETACEOUS POLLEN AND SPORES IN EASTERN MONTANA

J. W. HALL

NSF-GB-4090
9/65- 9/66

NSF-BIOLOGICAL + MEDICAL SCIENCES DIVISI

GSE 687 FIELD 13B

UNIV OF KENTUCKY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, KENTUCKY

FROZEN SOILS AND SOILS SUBJECTED TO FREEZE-THAW

B. O. HARDIN

NSF-GK-532
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 693 FIELD 13B

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

THE RESISTANCE OF SOILS TO SHEARING

M. I. ESRIG

NSF-GK-556
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GUW 264 FIELD 13B, 7D, 8D, 8H

UNIVERSITY OF ARIZONA, SCHOOL OF AGRICULTURE, AGRIC CHEM + SOILS, ARIZONA

TRACE AND TRACER ELEMENTS IN GROUND WATER

G. R. DUTT, G. E. DRAPER, R. M. MAIER R. A. PHILLIPS, E. S. SIMPSON L. G. WILSON

INT-B-001-ARIZ
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 283 FIELD 13B, 7C, 7D, 8D

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, WATER RESOURCES, GEORGIA

ADSORPTION OF IONS IN TRACE CONCENTRATIONS ON SOIL AND SILT PARTICLES

G. G. EICHHOLZ, J. B. CHAMPLIN G. +. EICHHOLZ

INT-A-002-GA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 297 FIELD 13G, 8F, 8H, 8G

UNIV OF MASSACHUSETTS, GRADUATE SCHOOL, GEOLOGY, MASSACHUSETTS

RELATION OF SEDIMENT LOAD TO HYDROLOGICAL CHARACTERISTICS OF CONNECTICUT RIVER

BETWEEN NORTHFIELD AND SPRINGFIELD, MASSACHUSETTS

M. O. HAYES

INT-A-006-MASS
6/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

GUW 313 FIELD 13G,13B, 8H

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WISCONSIN

THE EFFECT OF STREAMBANK CLOGGING ON UNSTEADY GROUNDWATER FLOW

P. L. MONKMEYER, A. G. LAW

INT-WR-A-010-WIS
7/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

GUW 314 FIELD 13G,13B,12A

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WISCONSIN

CHARACTERISTICS OF UNSTEADY, UNCONFINED FLOW OF GROUNDWATER

P. L. MONKMEYER, D. T. HIGGINS
W. W. KNAPP

INT-WR-A-005-WIS
7/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

GUW 319 FIELD 8H,12A, 8E

UNIV OF MINNESOTA, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, MINNESOTA

ANALYSIS OF FACTORS AFFECTING AQUIFER TEST RESULTS UNDER INDUCED STREAMBED INFILTRATION CONDITIONS WITH ELECTRIC ANALOG COMPUTERS

W. C. WALTON, E. A. ACKROYD

INT-WR-A-010-MINN
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 320 FIELD 8H,12A, 8E

UNIV OF MINNESOTA, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, MINNESOTA

GROUND-WATER CONTRIBUTION TO STREAMFLOW AND ITS RELATION TO HYDROGEOLOGIC BASIN

E. A. ACKROYD, C. NORBECK

INT-WR-A-009-MINN
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 323 FIELD 13B, 8D, 8H, 8G

UNIV OF MINNESOTA, SCHOOL OF AGR FOR H EC, SOIL SCIENCE, MINNESOTA

WATER ADSORPTION AND ITS INTERACTIONS WITH CLAY AND QUARTZ

G. R. BLAKE

INT-WR-A-006-MINN
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 325 FIELD 8F, 8H

UNIV OF MINNESOTA, SCHOOL OF AGR FOR H EC, AGRIC ENGINEERING, MINNESOTA

THE EFFECT OF POTHOLE DRAINAGE UPON GROUNDWATER RESOURCES

P. W. MANSON, E. H. ALLRED
G. M. SCHWARTZ

INT-WR-A-001-MINN
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 326 FIELD 8D, 8H, 8G

WEST VIRGINIA UNIV, GRADUATE SCHOOL, GEOLOGY, WEST VIRGINIA

GEOCHEMICAL AND SEDIMENTOLOGICAL ANALYSIS OF THE TYGART RIVER RESERVOIR

M. L. COLLIN, A. C. DONALDSON

INT-WR-A-009-WVA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 337 FIELD 8H, 7B

UNIVERSITY OF IDAHO, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, IDAHO

DETAILED GROUND WATER INVESTIGATION OF THE MOSCOW BASIN, IDAHO

R. W. JONES, A. ROSS

INT-WR-A-011-IDA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 343 FIELD 13B, 8H, 8+, 9+

UNIVERSITY OF IDAHO, GRADUATE SCHOOL, WATER RESOURCES, IDAHO

ELECTRONIC MEASUREMENT AND TELEMETRY OF HYDROLOGIC DATA

G. A. MCKEAN, L. A. BEATTIE, G. +. MCKEAN
A. C. ROBERTSON, K. E. WALTZ

INT-WR-A-006-IDA
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 346 FIELD 13B, 8H

UNIVERSITY OF IDAHO, GRADUATE SCHOOL, WATER RESOURCES, IDAHO

HYDROLOGY OF FROZEN GROUND FLOODS

A. C. ROBERTSON, G. L. BLOOMSBURG
A. +. ROBERTSON

INT-WR-A-016-IDA
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INTERIOR-OFFICE OF WATER RESOURCES

GUW 354 FIELD 8D, 8H, 8G

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

HYDROLOGIC ASPECTS OF PRE-LAHONTAN SEDIMENTS IN NEVADA

M. D. MIFFLIN

INT-WR-A-007-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 359 FIELD 13B, 8H

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

EVAPOTRANSPIRATION MAP OF THE STATE OF NEVADA
G. B. MAXEY

INT-WR-A-012-NEV
/66- /
INTERIOR-OFFICE OF WATER RESOURCES

GUW 361 FIELD 13B, 8H, 8G

UNIVERSITY OF NEVADA, GRADUATE SCHOOL, DESERT RESEARCH INST, NEVADA

DELINEATING THE GROUND-WATER FLOW SYSTEMS OF NEVADA

M. D. MIFFLIN, G. B. MAXEY

INT-WR-B-996-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 368 FIELD 8D, 8F, 8H

UNIV OF MASSACHUSETTS, GRADUATE SCHOOL, GEOLOGY, MASSACHUSETTS

CONFERENCE ON ECONOMIC GEOLOGY IN MASSACHUSETTS

O. C. FARQUHAR

INT-WR-A-014-MASS
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 381 FIELD 8D, 8F, 8H, 8G

AVAILABILITY, DISTRIBUTION, QUANTITY AND QUALITY OF WATER RESOURCES IN CARBONATE KARST TERRAIN

J. C. MAXWELL, V. A. GEVECKER
S. G. GRIGOROPOULOS, J. +. MAXWELL

INT-WR-A-001-MO
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 383 FIELD 8D, 8H, 8G

DRILLED WELL INVESTIGATION OF DOLOMITE AQUIFER CHARACTERISTICS

J. C. MAXWELL, J. +. MAXWELL

INT-WR-B-004-MO
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

NIL 157 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

BEHAVIOR OF SOILS SUBJECTED TO REPEATED STRESS APPLICATIONS

T. K. LIU, C. H. HURLEY, T. H. THORNBURN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 158 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

REPRODUCIBILITY OF ATTERBERG LIMITS

T. K. LIU, N. O. SCHMIDT, T. H. THORNBURN
/65- /

ILLINOIS, UNIVERSITY OF

NIL 172 FIELD 13G, 8H

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MIN METAL + PETROL ENG, ILLINOIS

FURTHER STUDY OF AQUIFER PERFORMANCE
W. ROSE, H. PARA, B. SINGH /65- /
ILLINOIS, UNIVERSITY OF

TL 250 2 FIELD 8D, 8G

HEBREW UNIVERSITY, ISRAEL

EXCAVATION OF EARLIEST PLEISTOCENE DEPOSITS OF THE JORDAN RIVER

G. HAAS
3/65- 2/66
AMERICAN PHILOSOPHICAL SOCIETY

YIL 293 FIELD 13B, 8G,12A, 8E

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

SOIL EXPLORATION AND MAPPING

T. H. THORNBURN, W. C. ETTER, T. K. LIU
/65- /

STATE-ILLINOIS

YOR 373 FIELD 13B

OREGON STATE UNIV, AGRICULTURAL EXPT STA, SOILS, OREGON

GENERAL SOIL MAP OF THE WILLAMETTE RIVER BASIN

G. SIMONSON

OREG-0679
/66- /

STATE-OREGON

YSC 134 FIELD 7D, 8H,13B, 8+

CLEMSON UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, SOUTH CAROLINA

DEVELOPMENT OF PORTABLE STREAM SURVEY INSTRUMENTATION

A. R. ABERNATHY
9/64- 9/65

STATE-SOUTH CAROLINA

ZQF 260070 FIELD 3C, 8F, 8N, 8G

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ANALYSIS OF THE EARTHS GRAVITY FIELD

B. SZABO
/65- /

DOD-AIR FORCE

ZQF 260073 FIELD 8D, 8G, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

AIRBORNE GRAVITY METER AND GRAVITY INSTRUMENTATION RESEARCH

R. M. PERRY
/65- /

DOD-AIR FORCE

ZQF 260075 FIELD 8N, 8G, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

FEASIBILITY TESTS OF GRAVIMETRIC TECHNIQUES

R. M. PERRY
/65- /

DOD-AIR FORCE

ZQF 260101 FIELD 8K, 8G

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

SOURCE MECHANICS

R. E. RIECKER
/65- /

DOD-AIR FORCE

ZQF 260156 FIELD 3C, 8F, 8N, 8G

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

THEORETICAL STUDIES AND TECHNIQUES FOR MEASURING THE EARTHS GRAVITATIONAL AND GEODETIC PARAMETERS

B. SZABO
/65- /

DOD-AIR FORCE

ZQF 260171 FIELD 8D, 8F, 8G, 8H

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

TERRESTRIAL LANDFORMS AND ENVIRONMENTAL PROCESSES

J. T. NEAL
/65- /

DOD-AIR FORCE

09. Electronics and Electrical Engineering

1FR 111 3 FIELD 12A, 6D

DUKE UNIVERSITY, SCHOOL OF MEDICINE, PHYSIOLOGY, NORTH CAROLINA

GENERAL PURPOSE ANALOG--DIGITAL CONVERSION FACILITY

E. C. LONG, T. M. GALLIE, L. J. JONES
W. D. OBRIST
10/65- 9/66

PHS-NIH-RESEARCH FACILITIES + RESOURCES

GH 1500 1 FIELD 20+, 9+, 5A,20F

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, PHYSICS, GEORGIA

DESIGN, CONSTRUCT AND EVALUATE AN INTERFERENCE SPECTROMETER TO OPERATE IN THE WAVELENGTH REGION BETWEEN 3.1 TO 4 MILLMETERS

W. K. RIVERS

NASA-NSG-258-SI-3
5/64- 4/65

NASA

GPE 869 2 FIELD 6B, 9+, 9A,10A

GENERAL ELECTRIC CORP, PHILADELPHIA, PENNSYLVANIA

RESEARCH STUDY OF THE NOISE CHARACTERISTICS AND ENERGY RESOLUTION OF CONTOURED SEMICONDUCTOR RADIATION DETECTORS

J. B. TRICE, G. C. HUTH, J. *. TRICE

AT(30-1)3246
6/65- 4/66

AEC-BIOLOGY + MEDICINE

GQF 259015 2 FIELD 9+,12A, 9C

COLUMBIA UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

STUDY + DESIGN A SMALL-SCALE COMPUTER SYSTEM HAVING AN ALGERAIC PROCEDURE-ORIENTED LANGUAGE

T. R. BASHKOW

AF-19-628-02798
/65- /

DOD-AIR FORCE

GQF 259092 1 FIELD 9+, 9A,12A, 9C

GENERAL ELECTRIC CO, SYRACUSE, NEW YORK

THEORETICAL STUDY OF ANTENNA ARRAY SYNTHESIS BY MATHEMATICAL TECHNIQUES FOR NONUNIFORM SPACE + PHASE

S. L. SHIH

AF-19-628-03842
/65- /

DOD-AIR FORCE

GQF 259103 1 FIELD 9+, 9A

RESEARCH ON THE RADIATIVE PROPERTIES OF STRUCTURES OF PERIODIC SPATIAL VARIATION

R. B. KIEBURTZ

AF-19-628-04144
/65- /

DOD-AIR FORCE

GQF 259113 FIELD 9+, 9A,12A, 9D

HUGHES AIRCRAFT CO, CULVER CITY, CALIFORNIA

EXPERIMENTAL INVESTIGATION + SYNTHESIS OF PARTIALLY COHERENT EM RADIATING SYSTEMS IN VARIOUS MEDIA

G. O. YOUNG

AF-19-628-04358
/65- /

DOD-AIR FORCE

GQF 260641 FIELD 9+, 9A

WATKINS-JOHNSON CO, PALO ALTO, CALIFORNIA

PROCUREMENT OF 3 AMPLIFIERS TRAVELLING-WAVE TUBE DUTY FACTOR CW LOW NOISE PERM MAGNET

. NONE

AF-19-628-05250
/65- /

DOD-AIR FORCE

GQF 284616 2 FIELD 9+, 9A,12A, 9C

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

ACTIVE NETWORK THEORY

N. DECLARIS

AF-33-615-01274
/65- /

DOD-AIR FORCE

GQF 284874 FIELD 9+

HUGHES AIRCRAFT CO, CULVER CITY, CALIFORNIA

NETWORK SYNTHESIS AND SENSITIVITY RSCH

I. M. HOROWITZ
/65- /

DOD-AIR FORCE

ZQF 260016 FIELD 12A, 9D

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

COMMUNICATION THEORY

C. F. HOBBS /65- /
DOD-AIR FORCE

ZQF 260019 FIELD 9+,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

MODULATION AND DETECTION THEORY

J. N. PIERCE
/65- /

DOD-AIR FORCE

ZQF 260020 FIELD 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

NETWORK THEORY

K. H. HAASE

/65- /

DOD-AIR FORCE

ZQF 260026 FIELD 9+,12A, 5C, 9C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

THEORY OF COMBINATORIAL AND SEQUENTIAL NETS

R. H. URBANO

/65- /

DOD-AIR FORCE

ZQF 260030 FIELD 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

PHYSICAL REALIZATION OF LOGIC STRUCTURE

M. E. BROOKING

/65- /

DOD-AIR FORCE

ZQF 260541 FIELD 9+, 9A,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ADVANCED ANTENNA TECHNOLOGY

C. E. ELLIS

/65- /

DOD-AIR FORCE

ZQF 260544 FIELD 9+,12A, 9D, 5C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

CODING TECHNIQUES

C. F. HOBBS

/65- /

DOD-AIR FORCE

ZQF 260547 FIELD 9+,12A, 5C, 9C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

LOGIC NETWORK SYNTHESIS

R. H. URBANO

/65- /

DOD-AIR FORCE

ZQF 260549 FIELD 9+, 9A,12A, 9C

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

LOGIC TECHNOLOGY

M. E. BROOKING

/65- /

DOD-AIR FORCE

ZQF 284883 FIELD 9C, 9+, 9A

USAF, AF ACADEMY, ACADEMY, COLORADO

SLOT ANTENNAS ON CURVED SURFACES

R. W. BURTON

/65- /

DOD-AIR FORCE

ZQF 284921 FIELD 9+,12A, 9C

USAF, AF ACADEMY, ACADEMY, COLORADO

HYBRID COMPUTATION TECHNIQUES

R. C. LATHROP

/65- /

DOD-AIR FORCE

10. Energy Conversion (Non-propulsive)

GH 528 1 FIELD 7D

ALFRED UNIVERSITY, UNDERGRADUATE SCHOOL, CHEMISTRY, NEW YORK

AN INVESTIGATION OF FUEL CELL PERFORMANCE UNDER NON-EQUILIBRIUM CONDITIONS, INCLUDING CONSIDERATION OF OPERATION UNDER PULSED-LOADIN

T. J. GRAY

NASA-NSG-384-SP-4
6/64- 5/65

NASA

GUJ 27 FIELD 10B

POPE, EVANS + ROBBINS, NYC, NEW YORK

HIGH CAPACITY PACKAGED COAL FIRED HEATING PLANT

M. POPE, J. W. BISHOP, L. DEMING

INT-14-01-0001-478
/66- /

INTERIOR-OFFICE OF COAL RESEARCH

GUJ 28 FIELD 9C,10B

WESTINGHOUSE ELEC CO, DIST OF COLUMBIA

COAL-FIRED MHD POWER PLANT

E. V. SOMERS, T. J. FAGAN, T. C. TSU
S. WAY, W. E. YOUNG
/66- /

INTERIOR-OFFICE OF COAL RESEARCH

11. Materials

GPF 462 3 FIELD 7D,20M,11F,13H

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, MATERIALS SCIENCE, CALIFORNIA

THERMODYNAMIC PROPERTIES OF METAL SYSTEMS

D. A. STEVENSON

AT-04-3-283
8/65- 7/66

AEC-DIVISION OF PHYSICAL RES

GPF 463 4 FIELD 7C, 7A, 7D,11F

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

PHYSICAL PROPERTIES AND ALLOYING BEHAVIOR OF ALKALI AND ALKALINE EARTH METALS

F. A. KANDA, W. CARTER, R. FAXON
G. MALLING, G. MAXWELL, J. MEYERS

AT-30-1-2731
8/65- 7/66

AEC-DIVISION OF PHYSICAL RES

NIL 71 FIELD 20M,11B,11F,20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CERAMIC ENGINEERING, ILLINOIS

PHYSICAL AND ELECTRICAL PROPERTIES OF METAL MODIFIED ZIRCONIUM OXIDE CERMETS

R. L. COOK, R. L. BOLTON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 75 FIELD 7D, 7A,11B, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CERAMIC ENGINEERING, ILLINOIS

SOLID STATE FORMATION OF COMPOUNDS IN THE SYSTEM SODA-TITANIA

R. L. COOK, R. S. HARMER

/65- /

ILLINOIS, UNIVERSITY OF

12. Mathematical Sciences

GSE 648 1 FIELD 12A,22C,13M,20L

PURDUE UNIVERSITY, SCHOOL OF ENGINEERING, AERONAUTICAL ENGIN, INDIANA

APPLIED STOCHASTICS

J. L. BOGDANOFF, F. KOZIN

NSF-GP-3236
6/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

13. Mechanical, Industrial, Civil, and Marine Engineering

7GX 775 2 FIELD 13B

UNIV OF CINCINNATI, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, OHIO

FIELD EVALUATION OF EXTENDED AERATION PLANTS

J. D. EYE, J. MORAND, A. RUBIN
P. V. SCARPINO

7-WP-00693-02
9/65- 8/66

PHS-BSS

7GX 1361 2 FIELD 13B, 8H,20D

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, MASSACHUSETTS

POLLUTANTS IN HETEROGENEOUS AND ANISOTROPIC AQUIFERS

D. R. HARLEMAN, U. SHAMIR, M. WATHNE

7-WP-00711-02
9/65- 8/66

PHS-BSS

7GX 1596 2 FIELD 13G, 8H, 8G,20D

TEXAS A + M UNIVERSITY, AGRICULTURAL EXPT STA, AGRIC ENGINEERING, TEXAS

WATER POLLUTION FROM ERODED SEDIMENTS

E. T. SMERDON, W. B. DAVIS, L. J. GLASS

7-WP-00757-02
9/65- 8/66

PHS-BSS

7GX 1820 2 FIELD 8H,12A, 8E

NEW YORK UNIVERSITY, SCHOOL OF ENGINEERING, METEOROL + OCEANOGRAPH, NEW YORK

COMPUTER INTERPRETATION OF DYE DUMP STUDIES

E. MEHR, W. J. PIERSON

7-WP-00662-02
9/65- 8/66

PHS-BSS

7GX 2049 2 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ORGANO-CLAY ADSORPTIVE REACTIONS AND WATER COAGULATION

B. B. EWING, R. M. JORDEN

7-WP-00801-02
9/65- 8/66

PHS-BSS

GH 1584 4 FIELD 10B

IOWA ST UNIV SCI TECH, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, IOWA

APPLICATION OF BLADE ELEMENT TECHNIQUES TO THE DESIGN AND PERFORMANCE PREDICTION PROBLEMS FOR AXIAL FLOW PUMPS

G. K. SERDVY

NASA-NSG-62-E-3
12/63- 3/65

NASA

GSE 656 FIELD 13G,20D

COLORADO STATE UNIV, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

STABLE ALLUVIAL CHANNELS

H. W. SHEN, D. B. SIMONS

NSF-GK-549
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 690 FIELD 13G,13B, 8D, 8G

UNIV OF WISCONSIN, GRADUATE SCHOOL, GEOLOGY, WISCONSIN

ENGINEERING PROPERTIES OF LAKE MICHIGAN SEDIMENTS

G. E. HEIN

NSF-GK-576
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 697 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ENGINEERING PROPERTIES OF HIGHLY PLASTIC CLAYS AND CLAY SHALES

R. E. OLSON

NSF-GK-531
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 707 FIELD 13G, 8F, 8H, 8G

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, CALIFORNIA

TRANSPORT, DEPOSITION AND SCOUR OF FINE PARTICLES THROUGH A POROUS MEDIUM

H. A. EINSTEIN

NSF-GK-591
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 749 FIELD 12A,13M,20L,20K

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, THEORETICAL + AP MECH, NEW YORK

METHODS OF ENGINEERING ANALYSIS

R. H. LANCE

NSF-GK-687
10/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 751 FIELD 20L,20K

CLEMSON UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, SOUTH CAROLINA

THE MECHANISM OF FATIGUE IN PLAIN CONCRETE

J. O. ANTRIM

NSF-GK-670
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 754 FIELD 20L,20K

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, TEXAS

STRUCTURAL CAPACITY OF CONCRETE-FILLED METAL TUBING

R. W. FURLONG

NSF-GK-661
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 759 FIELD 20L,20K

UNIVERSITY NEW MEXICO, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW MEXICO

ELASTIC STABILITY OF LATTICED BEAM-COLUMNS

C. OMIDVARAN

NSF-GK-682
11/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

GUE 141 FIELD 13B, 8D, 8H, 8G

UNIVERSITY OF ARIZONA, SCHOOL OF AGRICULTURE, WATERSHED MANAGEMENT, ARIZONA

CONSERVATION AND INLAND DISPOSAL OF A BLENDED INDUSTRIAL WASTE EFFLUENT USING ARTIFICIAL RECHARGE TECHNIQUES

L. G. WILSON, K. J. DECOOK, G. R. DUTT K. L. DYER
/66- /

INTERIOR-OFFICE OF SALINE WATER

GUH 33 FIELD 13G

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

SMALL DAMS ENGINEERING RESEARCH

R. B. PECK, D. R. CASAGRANDE
M. W. EMERSON, H. O. IRELAND

2/65- 2/66

INTERIOR-BUREAU SPORT FISH WLIFE

GUW 305 FIELD 13G, 8H

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

OPTIMIZATION OF WATER RESOURCES DEVELOPMENT

W. A. HALL, N. BURAS, W. S. BUTCHER T. ROEFS

INT-WR-B-008-CAL
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 308 FIELD 13B, 8H, 8G

UNIVERSITY OF NEVADA, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEVADA

A STUDY OF THE POTENTIAL RECHARGE OF LAS VEGAS GROUND WATER BASIN WITH RECLAIMED WASTE WATER

R. ORCUTT

INT-WR-B-999-NEV
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

NIL 141 FIELD 13B,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ULTIMATE-LOAD ANALYSIS OF EDGE-LOADED RECTANGULAR FOUNDATION SLABS

D. V. REDDY
/65- /

ILLINOIS, UNIVERSITY OF

NIL 150 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

STABILITY OF ORE RETAINING STRUCTURES

R. B. PECK, D. U. DEERE
/65- /

ILLINOIS, UNIVERSITY OF

NIL 151 FIELD 13B,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

BUCKLING AND LATERAL STABILITY OF PILES

M. T. DAVISSON, K. E. ROBINSON
/65- /

ILLINOIS, UNIVERSITY OF

NIL 153 FIELD 13B, 8F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

TERRAIN QUANTIFICATION FACTORS AS CORRELATED WITH ENGINEERING PROPERTIES OF SOILS

T. H. THORNBURN, T. K. LIU, R. R. VADNAIS
/65- /

ILLINOIS, UNIVERSITY OF

NIL 154 FIELD 13B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ENGINEERING DEFINITION OF ORGANO-MINERAL SOILS

T. K. LIU, K. HABIBAGAHI, N. D. SCHMIDT
T. H. THORNBURN

/65- /

ILLINOIS, UNIVERSITY OF

NIL 155 FIELD 8G,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

RADIAL DISPLACEMENT AND DILATATION OF THE WALLS OF A LARGE UNDERGROUND OPENING IN ROCK

D. U. DEERE, E. J. CORDING, D. W. DEERE
/65- /

ILLINOIS, UNIVERSITY OF

NIL 156 FIELD 8G,12A, 8E,13M

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ELASTIC-PLASTIC ANALYSIS OF UNDERGROUND OPENINGS BY THE FINITE ELEMENT METHOD

D. U. DEERE, D. W. DEERE, S. F. REYES
/65- /

ILLINOIS, UNIVERSITY OF

NIL 162 FIELD 13F

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

RAILWAY BALLAST STABILITY RESEARCH

W. W. HAY, T. M. SALEM
/65- /

ILLINOIS, UNIVERSITY OF

NIL 173 FIELD 13G, 8D, 8H

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MIN METAL + PETROL ENG, ILLINOIS

ASPECTS OF RESERVOIR ENGINEERING

W. ROSE, H. FARA, B. SINGH
/65- /

ILLINOIS, UNIVERSITY OF

NO 3 2 FIELD 13B

UNIVERSITY OF FLORIDA, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, FLORIDA

ANTI-POLLUTION AND SEWAGE DISPOSAL FOR FLORIDA COMMUNITIES

T. D. FURMAN, H. D. PUTNAM

DN-5641
7/65- 6/66

FLORIDA, UNIVERSITY OF

NP 5 FIELD 13G,20D

UNIVERSITY OF COLORADO, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, COLORADO

STABILITY OF STONES IN OPEN CHANNEL FLOW

J. E. FLACK, W. JHONEJO
/66- /

COLORADO, UNIVERSITY OF

NUS 44 FIELD 13B

UTAH ST UNIV OF AGRIC, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, UTAH

THEORY OF CONSOLIDATION COMBINING PRIMARY AND SECONDARY CONSOLIDATION

I. S. DUNN 7/65- 6/66
UTAH STATE UNIVERSITY

XZ 876 FIELD 13A

PROV HEALTH DEPT, QUEBEC, CANADA

THE COMPARISON OF AIR QUALITY AND METEOROLOGY BETWEEN PORT ALBERNI/ALBERNI AND CHILLIWACK

O. O. ANDERSON, J. M. SMITH

609-7-112
7/65- 6/66

CANADA-DEPT OF NATL HEALTH + WELFARE

XZ 883 FIELD 13B

DEPT OF PUB HLTH EDMTN, CANADA

AERATION OF ANAEROBIC SEWAGE POND EFFLUENT

N. J. DECK

608-7-81
7/65- 6/66

CANADA-DEPT OF NATL HEALTH + WELFARE

YIL 279 FIELD 13F,12A,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

HIGHWAY BRIDGE IMPACT

W. M. WALKER, R. LUTHEGARCIA, C. P. SIESS
A. S. VELETSOS
/65- /

STATE-ILLINOIS

YOR 324 1

OREGON STATE UNIV, AGRICULTURAL EXPT STA, FOREST SCIENCE, OREGON

DETERMINATION OF STRENGTH OF RESIDENTIAL FLOORS

G. M. ATHERTON

OREG-0698
/66- /

STATE-OREGON

YSC 135 FIELD 13G,13B

CLEMSON UNIVERSITY, AGRICULTURAL EXPT STA, AGRIC ENGINEERING, SOUTH CAROLINA

WASTE DISPOSAL FROM FOOD PROCESSING PLANTS IN SOUTH CAROLINA

J. R. LAMBERT, T. C. PEELE, T. L. SENN
A. W. SNELL, H. J. WEBB
/65- /

STATE-SOUTH CAROLINA

14. Methods and Equipment

GPE 316 3 1 FIELD 7D, 7C, 7A,18A

TRACERLAB INC, RICHMOND, CALIFORNIA

PHYSICAL, CHEMICAL AND RADIOCHEMICAL ANALYSIS OF FILTER DEBRIS

L. LEVENTHAL, P. A. BENSON

AT-04-3-453
1/65-12/65

AEC-BIOLOGY + MEDICINE

GSE 756 FIELD 9+

INST OF ELECTRICAL +, ELECTRONIC ENGINRS-NYC, NEW YORK

1966 CONFERENCE ON PRECISION ELECTROMAGNETIC MEASUREMENTS

W. MARKOWITZ

NSF-GK-652
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GUW 77 FIELD 8H,12A, 8E

SOUTH DAKOTA ST UNIV, SCHOOL OF ENGINEERING, WATER RESOURCES, SOUTH DAKOTA

ESTABLISHMENT OF WATER QUALITY LABORATORY AND SYSTEM FOR STORAGE AND RETRIEVAL OF INFORMATION

J. L. WIERSMA, P. L. KOEPSELL

INT-WR-A-009-SDAK
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

ZPE 1144 FIELD 6B, 9+, 9A

US, AEC, OPER OFFICE, NEW YORK

RESEARCH AND DEVELOPMENT OF INSTRUMENTATION COMPONENTS

R. T. GRAVESON, M. E. CASSIDY, S. WATNICK
/66- /
AEC-BIOLOGY + MEDICINE

ZQF 284901 FIELD 12A,20L,20D,20K

USAF, AF ACADEMY, ACADEMY, COLORADO

STRUCTURAL ANALYSIS OF THE SHOCK TUBE AND SUPPORT SYSTEM

D. S. JOHNSON
/65- /
DOD-AIR FORCE

17. Navigation, Communications, Detection, and Countermeasures

GQF 259018 FIELD 9+

NORTHEASTERN UNIV, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MASSACHUSETTS

RESEARCH STUDY ON STATISTICAL COMMUNICATIONS

S. H. CHANG

AF-19-628-03312
/65- /

DOD-AIR FORCE

GQF 259041 FIELD 9+

NEW YORK UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

THEORET + EXPER EFFORT ON ADVANTAGES OR FEEDBACK IN IDEAL ERROR FREE + REAL NOISY COMM SYSTEMS

L. S. SCHWARTZ

AF-19-628-04321
/65- /

DOD-AIR FORCE

GQF 259046 FIELD 9D,12A

UNIVERSITY OF HAWAII, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, HAWAII

RSCH ON CODING FOR MINIMUM ERROR TRANSMISSION + FOR MACHINE INFO PROCESSING VIA SYNTHETIC LANGUAGES

W. W. PETERSON

AF-19-628-04379
/65- /

DOD-AIR FORCE

18. Nuclear Science and Technology

GPE 124 3

UNIVERSITY OF ILLINOIS, ILLINOIS

RAINOUT OF RADIOACTIVITY IN ILLINOIS

F. A. HUFF, P. FETERIS, R. GANS
F. A. HUFF, D. M. JONES, G. E. STOUT

AT(11-1)1199
6/65- 1/66

AEC-BIOLOGY + MEDICINE

GPE 806 1 FIELD 20J,18A,20F,20L

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

THE ROLE OF HIGH ELECTRIC FIELDS IN PHOSPHOR RADIATION DOSIMETRY

H. K. HENISCH, W. R. BUESSEM
K. MIYASHITA

AT(30-1)3409
6/65- 5/66

AEC-BIOLOGY + MEDICINE

GPF 18 3 FIELD 6B, 9+,18A,20H

OREGON STATE UNIV, GRADUATE SCHOOL, PHYSICS, OREGON

LOW ENERGY NUCLEAR RESEARCH

L. SCHECTER, E. BARNES, L. COOPER
H. T. EASTERDAY, T. G. KELLEY
V. A. MADSEN, D. B. NICODEMUS

AT(45-1)-1062
11/65-10/66

AEC-DIVISION OF PHYSICAL RES

GPF 299 2 FIELD 12A,20H, 5A,18A

UNIVERSITY OF HAWAII, GRADUATE SCHOOL, PHYSICS, HAWAII

RESEARCH IN HIGH ENERGY NUCLEAR PHYSICS

V. Z. PETERSON, R. J. CENCE, P. N. DOBSON
V. J. STENGER

AT-04-3-511
4/65- 3/66

AEC-DIVISION OF PHYSICAL RES

20. Physics

IGM 12383 2 FIELD 5A,18A,20H,20L

MONTANA STATE COLLEGE, GRADUATE SCHOOL, PHYSICS, MONTANA

PHOTONIC SEMICONDUCTORS

V. H. SCHMIDT
9/65- 8/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

GH 352 5 FIELD 20F,20I, 7B

RENSSELAER POLYTC INST, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

INVESTIGATION OF THE PROPERTIES OF GASEOUS PLASMAS BY MICROWAVE TECHNIQUES

E. H. HOLT, D. A. HUCHITAL

NASA-NSG-48-P-1
9/64- 8/65

NASA

GH 712 1 FIELD 20+, 9+,20I

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, TEXAS

PROPAGATION AND DISPERSION OF HYDROMAGNETIC AND ION CYCLOTRON WAVES IN PLASMAS IMMERSED IN MAGNETIC FIELDS

A. A. DOUGAL

NASA-NSG-353-P-1
2/64- 1/65

NASA

GH 763 1 FIELD 21I, 7D,11G,20L

UNIV OF WASHINGTON, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, WASHINGTON

STRESS ANALYSIS OF A VISCOELASTIC MODEL SUBJECTED TO TRANSIENT TEMPERATURE AND TIME-DEPENDENT LOADING

R. J. BOLLARD, E. H. DIRE, M. FOURNEY
C. W. FOWLKES

NASA-NSG-401-P-1
10/64- 9/65

NASA

GH 818 1 FIELD 9+,20I

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, MICHIGAN

STUDY OF PLASMA SHEATH ASSOCIATED WITH COMMUNICATIONS BLACKOUT

R. E. HIATT

NASA-NSG-472-E-2
6/64- 5/65

NASA

GPF 40 3 FIELD 6B, 9+,18A,20H

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS, MARYLAND

PROPERTIES OF K MESONS AND HYPERONS AND RELATED TOPICS

G. A. SNOW, E. F. BEALL, P. E. CONDON
T. B. DAY, R. G. GLASSER, B. KEHOE
B. SECHIZURN

AT(40-1)-2504
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 86 3 FIELD 20D,20L, 7B

RENSSELAER POLYTC INST, GRADUATE SCHOOL, PHYSICS, NEW YORK

ANISOTROPIC DIFFUSION AND ELECTROMIGRATION

H. B. HUNTINGTON, G. A. SULLIVAN

AT(30-1)-1044
12/65-11/66

AEC-DIVISION OF PHYSICAL RES

GPF 477 2 FIELD 9+, 9A,20L,20A

UNIV OF SOUTHERN CALIF, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

A STUDY OF MAGNETIC, THERMAL AND TRANSPORT CURRENT PHENOMENA IN HIGH FIELD SUPERCONDUCTORS

M. A. LEBLANC, D. J. GRIFFITHS

AT(11-1)113-16
1/66-12/66

AEC-DIVISION OF PHYSICAL RES

GPF 485 4 FIELD 20M,10B, 5A,20L

UNIV OF WISCONSIN, GRADUATE SCHOOL, PHYSICS, WISCONSIN

LOW TEMPERATURE PHYSICS

J. R. DILLINGER, B. L. BERMAN
R. E. FASSNACHT, G. T. FOX, D. M. JONES
R. P. MADDING, F. L. SCARPACE

AT(11-1)-1098
9/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 489 2 FIELD 20M,20J,20L, 7B

UNIVERSITY OF UTAH, GRADUATE SCHOOL, PHYSICS, UTAH

A MAGNETIC RESONANCE STUDY OF DEFECTS IN SOLIDS

W. D. OHLSEN, P. R. KINGSBURY
R. L. MARSHALL, K. F. NELSON

AT-11-1-1284
8/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GPF 744 1 FIELD 20M, 5A,20F,20D

ST. MARYS COLLEGE, UNDERGRADUATE SCHOOL, PHYSICS, MINNESOTA

SURFACE STRUCTURE AND ELECTRONIC PROPERTIES OF SINGLE CRYSTAL MOLYBDENUM AND TUNGSTEN RIBBONS

D. R. MORGAN, W. E. BLASS

AT(11-1)1417
11/65-10/66

AEC-DIVISION OF PHYSICAL RES

GPF 747 3 FIELD 5A,18A,20H, 7B

DUKE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NORTH CAROLINA

RESEARCH IN HIGH ENERGY PHYSICS

E. C. FOWLER, J. W. CHAPMAN, S. DAGAN
L. R. FORTNEY, B. MUSGRAVE, R. UHLIG

AT(40-1)-3065
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 774 2 FIELD 18A,20H,20F,20L

BROWN UNIVERSITY, GRADUATE SCHOOL, PHYSICS, RHODE ISLAND

EXPERIMENTAL AND THEORETICAL HIGH ENERGY PHYSICS

D. FELDMAN, L. N. COOPER, H. R. CROUCH
H. M. FRIED, M. M. ISLAM, Y. S. JIN
K. KANG

AT(30-1)-2262
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GQF 259111 FIELD 9+, 9A

POLYTECH INST BROOKLYN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

RESEARCH ON ELECTROMAGNETIC WAVEGUIDING + RADIATION ALONG DIVERSE INTERFACES

A. A. OLINER

AF-19-628-04324
/65- /

DOD-AIR FORCE

GQF 259708 FIELD 4A, 8+, 9+

UNIV OF RHODE ISLAND, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, RHODE ISLAND

RESEARCH ON EXTREMELY LOW FREQUENCY PROPAGATION WITH EMPHASIS ON SCHUMANN RESONANCES

C. POLK

AF-19-628-04950
/65- /

DOD-AIR FORCE

GQF 259844 2 FIELD 4A, 8+, 9+

UNIV OF UPPSALA, SWEDEN

STUDY EM SIGNALS IN THE AUDIO FREQ RANGE OF SUCH NATURAL PHENOMENON AS WHISTLERS + DAWN CHORUS

H. NORINDER

AF-61-052-00687
/65- /

DOD-AIR FORCE

GQF 550213 FIELD 20L

IIT RESEARCH INSTITUTE, AT ILL INST OF TECHNOL, ILLINOIS

THREE-DIMENSIONAL DYNAMIC PHOTOELASTICITY

J. DALLY, W. F. RILEY

AF-29-601-6696
/65- /

DOD-AIR FORCE

GSE 321 2 FIELD 9+, 9A,20F,20I

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

BASIC PLASMA PHENOMENA

G. S. KINO

NSF-GK-617
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 405 2 FIELD 20M,20D,20L, 7B

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

HELIUM II HEAT TRANSPORT

T. H. FREDERKING

NSF-GK-560
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 647 1 FIELD 12A,13M,20L

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, INST ENGINEERING RES, CALIFORNIA

VIBRATION OF NONLINEAR SYSTEMS HAVING MANY DEGREES OF FREEDOM

R. M. ROSENBERG, C. P. ATKINSON

NSF-G-24835
7/63-12/64

NSF-ENGINEERING SCIENCES DIVISION

GSE 685 FIELD 7D,20M,20D

UNIV OF KENTUCKY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, KENTUCKY

HEAT TRANSFER BY NATURAL CONVECTION FROM THE LOWER SIDE OF FINITE HORIZONTAL

R. M. DRAKE

NSF-GK-577
8/65- 7/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 721 FIELD 8C,12A, 8E,13M

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, ENGINEERING MECHANICS, MICHIGAN

DYNAMICS OF NONHOMOGENEOUS AND ROTATING FLUIDS

C. YIH

NSF-GK-637
9/65- 8/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 748 FIELD 12A,13M,20L,10B

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, CALIFORNIA

INFINITESIMAL SPATIAL MOTION THEORY

B. ROTH

NSF-GK-660
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 755 FIELD 20L,20K

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, AEROSPACE + MECH ENGIN, NEW YORK

PARAMETRIC RESPONSES OF MECHANICAL SYSTEMS

R. M. EVANIWANOWSKI

NSF-GK-666
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 762 FIELD 20D, 5A

AM INST CHEMICAL ENGRS, NEW YORK, NEW YORK

SYMPOSIUM ON THE MECHANICS OF VISCOELASTIC FLUIDS

F. J. VANANTWERPEN

NSF-GK-650
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 765 FIELD 20D,10B

MASS INST OF TECHNOL, SCHOOL OF ENGINEERING, NAVAL ARCH MARINE ENGR, MASSACHUSETTS

VARIABLE PRESSURE WATER TUNNEL RESEARCH

J. E. KERWIN

NSF-GK-683
11/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 766 FIELD 20D

STATE UNIV N Y BUFFALO, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, NEW YORK

SCALAR MIXING IN TURBULENT JETS OF NEWTONIAN AND NON-NEWTONIAN FLUIDS

K. M. KISER

NSF-GK-668
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GUW 157 FIELD 13G,13B, 8D, 8H

RUTGERS THE STATE UNIV, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, NEW JERSEY

TURBULENT DISPERSION IN WATER FLOW SYSTEMS

R. L. PESKIN

INT-WR-A-005-NJ
/66- /

INTERIOR-OFFICE OF WATER RESOURCES

GUW 311 FIELD 20D

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, WISCONSIN

DISPERSION IN FLOW THROUGH NON-HOMOGENEOUS POROUS MEDIA

J. A. HOOPES, W. S. STATON

INT-WR-A-012-WIS
7/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

JAG 2 FIELD 20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

FUNDAMENTAL STUDIES IN NONLINEAR VISCOELASTICITY

H. H. HILTON, A. F. FRASER, C. F. VAIL
/65- /

AEROJET-GENERAL CORPORATION

NIL 176 FIELD 20M,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

MOTION AND HEAT TRANSFER OF BUBBLES AND DROPLETS

B. T. CHAO, S. WINNIKOW /65- /
ILLINOIS, UNIVERSITY OF

ZQF 260022 FIELD 4A, 8+, 9+,20I

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

EXTREMELY-LOW-FREQUENCY WAVES AND HYDROMAGNETIC WAVES

H. POEVERLEIN /65- /
DOD-AIR FORCE

ZQF 260077 FIELD 3A, 4A,20I

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

THEORETICAL EM STUDIES

R. P. VANCOUR
/65- /

DOD-AIR FORCE

21. Propulsion and Fuels

GH 1583 4 FIELD 20D,10B,20H

UNIVERSITY OF MICHIGAN, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, MICHIGAN

THEORETICAL AND EXPERIMENTAL STUDIES OF THE DYNAMICS OF REACTING AND CHARGED PARTICLES IN SOLID PROPELLANT ROCKET MOTOR NOZZLES

J. A. NICHOLLS

NASA-NSG-86-E-1
4/64- 3/65

NASA

22. Space Technology

NIL 164 FIELD 13B, 3A

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

DESIGN CRITERIA FOR OUTER SPACE MAPPING
/65- /
H. M. KARARA
ILLINOIS, UNIVERSITY OF

TECHNICAL ABSTRACT BULLETIN

Field 1-AERONAUTICS

1/1. AERODYNAMICS

AD-629 632 Fld. 1/1, 1/3
CFSTI Prices: HC $8.60 MF $0.75
ARMY AVIATION MATERIEL LABS FORT EUSTIS VA
OV-1A MOHAWK FLIGHT LOADS INVESTIGATION PROGRAM.
Engineering lab. rept.,
by David Chestnutt, Jan 66, 57p. Rept. no. USAAVLABS-TR-66-6,
Proj. DA-1P125901A14229,
Unclassified report

Descriptors: (*Short take-off planes, Flight), Loading (Mechanics), Experimental data, Maneuverability, Design, Acceleration, Airspeed, Altitude, Weight

A primary objective of this effort was to provide operational data for establishing future short takeoff and landing (STOL) aircraft design criteria. To accomplish this end, two OV-1A aircraft were selected that were participating in air-assault maneuvers. Approximately 200 hours of flight data were recorded within approximately 10 weeks. The parameters recorded were: airspeed, altitude, outside air temperature, and acceleration at the aircraft center of gravity. In addition, supplementary data were collected on the type of mission and gross weight of the aircraft. These data are presented as several frequency-of-occurrence forms, exceedance curves, and gust spectra. (Author)

AD-629 637 Fld. 1/1
CFSTI Prices: HC $14.60 MF $1.00
DYNASCIENCES CORP FORT WASHINGTON PA
AN INVESTIGATION OF PROPELLER SLIPSTREAM EFFECTS ON V/STOL AIRCRAFT PERFORMANCE AND STABILITY.
Rept. for Apr 64-Mar 65,
by L. Butler, K. P. Huang, and L. Goland. Feb 66, 145p. Rept. no. DCR-174,
Contract DA-44-177-AMC-48 (T), Task 1P21401A14203,
USAAVLABS TR-65-81
Unclassified report

Descriptors: (*Short take-off planes, Performance (Engineering)), (*Vertical take-off planes, Performance (Engineering)), (*Propellers (Aerial), Stability), Stalling, Wings, Pitch (Motion), Analog computers

Specific areas investigated include wing stall during xsansition, minimum wing size for stall-free transition, and the effects of slipstream on aircraft pitching moments. In addition, a stability analysis was performed, and analog computer techniques were used to determine the feasibility of utilizing the slipstream for stability augmentation. Finally, the effects of the nonuniformity of slipstream velocity and wing geometry modifications on performance were analyzed. (Author)

AD-629 647 Fld. 1/1
CFSTI Prices: HC $12.60 MF $0.75
BOEING CO MORTON PA VERTOL DIV
INVESTIGATION OF AN ISOLATED MONOCYCLIC V/STOL PROPELLER PERFORMANCE AND OSCILLATORY STRESS.
Technical rept.,
by R. W. de Decker. Feb 66, 122p. Rept. no. R-432,
Contract DA-44-177-AMC-319 (T), Task 1P121401A14178,
USAAVLABS TR-65-80
Unclassified report

Descriptors: (*Propellers (Aerial), Performance (Engineering)), (*Vertical take-off planes, Tests), (*Short take-off planes, Tests), Oscillation, Stresses, Propeller blades, Control, Aerodynamic characteristics, Pitch (Motion), Stalling, Drag

Test results confirmed: (1) that there is an apparent phase shift of the monocyclic axis at high collective angle, caused by hysteresis in the airfoil's stall characteristics, and (2) that there is an increase in side force as collective angle is increased, caused by a nonlinear variation in airfoil drag with cyclic pitch. The monocyclic propeller test program also included investigation of the effects of control system stiffness on xhb dynamic response of the propeller and control system. The results indicate that the use of cyclic-blade-pitch control reduces the harmonic content of control system oscillatory loads to basically a first-harmonic response. Higher harmonic loads are present, but their amplitudes are less than 10 percent of the resultant peak-to-peak load, and are therefore considered negligible. The results of the program also indicate that the increase of control system stiffness resulted in an increase in blade-pitch-link oscillatory loads.

AD-629 441 See Fld. 1/2

1/2. AERONAUTICS

AD-629 441 Fld. 1/2, 1/1, 20/4, 20/11
CFSTI Prices: HC $26.30 MF $1.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
NEWS OF INSTITUTIONS OF HIGHER LEARNING. AERONAUTICAL ENGINEERING (COLLECTION OF ARTICLES), NO. 4, 1963.
6 Jan 66, 267p. Rept. no. FTD-MT-64-276, TT 66-60728
Unclassified report

Edited machine trans. of Izvesyiya Vysshikh Uchebnykh Zavedenii. Aviatsionnaya Tekhnika (USSR) n4 p1-186 1963.

Descriptors: (*Aeronautics, Engineering), (*Fluid flow, Scientific research), (*Structural parts, Fluid dynamic properties), (*Aerodynamics, Scientific research), Structural shells, Cylindrical bodies, USSR, Oscillation, Propeller blades, Heat transfer, Turbines, Compressors, Vortices, Thermodynamics

AD-629 453 Fld. 1/2, 14/5, 5/5
CFSTI Prices: HC $1.60 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
AN EXPERIMENTAL METHOD FOR DETERMINING THE FLIGHT PATH OF LOW-FLYING AIRCRAFT.
Technical note,
by Michael A. Famiglietti, and John A. Stephens. Jun 65, 11p. Rept. no. TN-5-65,
Unclassified report

Descriptors: (*Aeronautics, Photographic recording systems), (*Flight paths, Photographic recording systems), (*Photographic recording systems, Aeronautics), Army research, Aircraft, Low altitude, Mission profiles, Motion picture photography, Human engineering, Airborne, Man-machine systems

In human factors experiments related to Army airborne man-machine systems, data are often required that yield a low-flying aircraft's flight-path time history. This report describes an inexpensive method that simply requires two ground-based, synchronized motion-picture cameras. With this method, the aircraft's spatial coordinates are analytically determined as a function of time. (Author)

AD-629 642 Fld.
AD-629 642 Fld. 1/2
CFSTI Prices: HC $11.60 MF $0.75
OPERATIONS RESEARCH INC SILVER SPRING MD
MEASURES FOR THE IMPROVEMENT OF SAFETY IN ARMY AVIATION.
Technical rept.,
by Alex M. Anikeeff, Barry G. King, Joann H. Langston, Alan D. Morris, and Cecil R. Phillips. 15 Sep 60, 113p. Rept. no. tr-109,
Contract DA-44-177-TC-624,
Unclassified report

Descriptors: (*Aviation safety, Operations research), Army, Civil aviation, Aircraft, Aviation accidents, Army aircraft, Design, Pilots, Flight crews, Performance (Human), Training, Landings, Costs, Cockpits, Visibility, Instrument panels, Control systems, Landing gear, Safety devices, Helicopters, Statistical analysis, Tables

The emphasis of this study is directed toward methodology which will be useful in accident prevention research. The problem is approached through introduction of task element analysis to accident analysis and to airplane design; and through study of the broad civil aviation lightplane accident experience as a reference. The information usually gathered from pilot, crew, and observers at the time of an accident is insufficient to permit a complete study of the accident causes through task element analysis. More complete information regarding pilot and crew performance at the time of an accident must be obtained to enable task element analysis of the accident. Among the various landing procedures commonly used to avoid and recover from ground loops, the crab approach and the use of brakes were found to be most hazardous. The wing-low approach and the application of power to maintain directional control during roll-out were found to be more reliable procedures. The study of civil aviation accidents reveals that 50% of all accidents involve pilots having less than 50 hours time in type. Current experience in type is the single most important factor in accident prevention. Data from civil aviation accidents indicates that pilots with less than 50 hours time in type account for approximately 70% of ground-loop accidents on dry runways. (Author)

1/3. AIRCRAFT

AD-629 517 Fld. 1/3
CFSTI Prices: HC $3.60 MF $0.50
FRANKFORD ARSENAL PHILADELPHIA PA COMPONENTS ENGINEERING DIRECTORATE
ADAPTION OF XM30 CATAPULT TO OPERATIONAL CONDITIONS. TASK I. DESIGN OF CATAPULT, AIRCRAFT EJECTION SEAT: XM31. TASK II. MODIFICATION TO AIRCRAFT SEATS AND ROCKET CATAPULTS FOR ACTUATION OF COMPENSATING NOZZLES.
Technical research rept.,
by Charles S. Sterrett, and Norman J. Waecker. Dec 65, 36p. Rept. no. R-1790,
Unclassified report

Descriptors: (*Catapults, Design), (*Jettisonable cockpits, Design), (*Aircraft seats, Design), Rockets, Operation, Nozzles, Cartridges (PAD), Center of gravity, Human engineering, Military requirements

The report documents work performed on two tasks. Task I, 'Design of Catapult, Aircraft Ejection Seat: XM31,' describes the design emergent from the combination of rocket catapults XM30 and RAPEC III. This design, while incorporating features of both catapults, has an arrangement for

213-302 O-66-1

changing the angle of rocket thrust to compensate for changes in seat-man mass center of gravity due to seat positioning. The XM31 catapult was designed to correct an orientation problem with the RAPEC III catapult in Martin Baker seats. Task II, 'Modification of Aircraft Seats and Rocket Catapults for Actuation of Compensating Nozzles,' presents the mechanical systems to actuate the swivel nozzles of rocket catapults in F106 and T38 aircraft ejection seats. The XM30 catapult was modified for the F106 seat and a new catapult, the XM32, was designed for the T38 seat. The catapult and seat combinations will correct for misalignment of the seat -man mass center of gravity pattern with the centerline of rocket thrust, due to changes in seat height. (Author)

AD-629 635 Fld. 1/3, 10/2
CFSTI Prices: HC $4.00 MF $0.75
DYNATECH CORP CAMBRIDGE MASS
SUPERCONDUCTING ELECTRICAL MACHINERY AS A MEANS OF POWER TRANSMISSION IN AIRCRAFT.
Final rept.,
by Hugh A. Ribinson, John R. Blutt, and Henry W.Mooncai. Jan 66, 108p. Rept. no. Dynatech-620,
Contract DA-44-177-AMC-288 (T), Task DA-1P125901A01410,
USAAVLABS TR-66-11

Unclassified report

Descriptors: (*Superconductors, Electrical equipment), (*Electrical equipment, Aircraft engines), (*Aircraft engines, Superconductors), Transmission lines, Performance (Engineering), Power, Superconductivity, Cryogenics, Machines

The advantages and limitations encountered in adapting superconducting electrical machinery to replace the mechanical power transmission system in aircraft are presented. Major components and system arrangements are evaluated and compared relative to weight, volume, efficiency, reliability, readiness, and cost. The superconducting systems when used in high total power applications are competitive on the basis of weight and efficiency, occupy a greater volume, but are more reliable when compared with the equivalent mechanical system. (Author)

AD-629 648 Fld. 1/3
CFSTI Prices: HC $5.60 MF $0.75
HAWKER-SIDDELEY CANADA LTD TORONTO (ONTARIO)
GEMINI ONE-TON AMPHIBIOUS OFF-HIGHWAY AIRTRANSPORTABLE VEHICLE, CONTINUATION OF PHASE I PROGRAM.
Final rept., Jun 64-Aug 65,
by F. H. Keast. Feb 66, 55p. Contract DA-44-177-AMC-21 (T) Task 1P125901A14203,
USAAVLABS TR-65-83

Unclassified report

See also AD-607 345.

Descriptors: (*Ground effect machines, Model tests), (*Amphibious vehicles, Ground effect machines), Design, Canada, Mobility, Terrain, Clay, Noise, Water, Environmental tests

The report presents the further results of testing a full-scale mock-up chassis representative of a 1-ton, amphibious, off-highway, air-transportable vehicle which utilizes air cushion principles to permit mobility in low-bearing terrain. The test vehicle was modified and subjected to tests in water. A skirt was fitted and the vehicle was tested in prepared clay beds of low cone index and on a level, hard surface. Noise level tests were also carried out. Further work to improve directional control and speed in water and to improve skirt structure is recommended to attain optimum performance. (Author)

AD-629 725 Fld. 1/3
CFSTI Prices: HC $3.00 MF $0.75
KANSAS UNIV LAWRENCE CENTER FOR RESEARCH
GEM RESEARCH AT THE UNIVERSITY OF KANSAS.
Technical rept. no. 1, Oct 63-Dec 65,
by C. J. Choliasmenos, V. Sundararajan, W. F. Teague, and J. B. Tiedemann. 30 Dec 65, 98p. Contract Nonr-4201 (00)

Unclassified report

Descriptors: (*Ground effect machines, Scientific research), Universities, Flight, Flight control systems, Aerodynamic characteristics, Pilots, Training, Flexible structures, Maneuverability, Flight simulators, Flight testing

Overland maneuvering of a ground effect machine in close quarters at low speeds is extremely difficult. Novice pilots tend to scan the control axes cyclically, and to pulse the controls to maximum excursion in the manner of an off-on servomechanism rather than a proportional controller. Control is simplified by disabling the lateral acceleration system, or by utilizing an automatic lateral drift stabilizer. Lateral friction resulting from wheel contact at light pressure enormously improves the overland handling qualities of a ground effect machine. Even the most rudimentary flight simulator provides valuable experience in the unique 'feel' of a ground effect machine, and gives effective forewarning of what to expect at the controls of a real machine. It is theoretically possible to build an 'inverted' ground effect machine, that inhales outside air into the cushion area and vents it to a propulsion duct. Such a device offers potential reductions in spray and dust problems and attractive structural features for shipboard stowage, at the expense of difficulty in heave stability. Static stability of the pressurized structure of the 'inverted' GEM has been investigated in detail, and some progress has been made toward flutter analysis of its flexible elements. (Author)

AD-628 937 **See Fld. 13/9**

AD-629 004 **See Fld. 14/2**

AD-629 632 **See Fld. 1/1**

AD-629 646 **See Fld. 20/1**

1/4. AIRCRAFT FLIGHT INSTRUMENTATION

AD-629 157 Fld. 1/4
CFSTI Prices: HC $9.60 MF $0.75
NORDEN DIV UNITED AIRCRAFT CORP NORWALK CONN
SIMULATION STUDIES OF AN INTEGRATED ELECTRONIC VERTICAL DISPLAY.
Technical progress rept. no. 2, 1 Jun 64-31 Dec 65,
by Peter R. Williams, and Marshall B. Kronholm. 31 Dec 65, 96p. Rept. no. 1161-R-0021,
Contract Nonr-4489 (00)

Unclassified report

Descriptors: (*Flight instruments, Television display systems), (*Television display systems, Flight instruments), Simulation, Aircraft, Display systems, Analog systems, Integrated circuits, Human engineering, Systems engineering

The objective of this program is the development of design specifications for a raster scan T.V. integrated flight display suitable for use in fixed-wing, rotarywing and VTOL aircraft. Information requirements were determined and quantified through a systematic analysis of mission requirements and aircraft performance capabilities. 'Data packages' are specified for the mission segments to serve as the basis for formulation of display concepts. Specific display formats are described whose content and dynamic behavior satisfy the analytical requirements. A simulation experimental design is presented which provides the necessary data for statistical analysis. Statistical analysis of simulation data indicates significantly better performance for the integrated display for four out of six flight tasks simulated. These include straight-level flight, maximum performance takeoff, instrument landing, and spot hover. Conclusions and specific design recommendations resulting from simulation results and subjective evaluations are presented. Significant among these are: desirability for quantitative indication of altitude, airspeed, vertical velocity and turn-rate; desirability of incorporating computed control information in the display for critical tasks. (Author)

1/5. AIR FACILITIES

AD-629 572 Fld. 1/5
CFSTI Prices: HC $2.60 MF $0.50
FEDERAL AVIATION AGENCY WASHINGTON D C AVIATION ECONOMICS STAFF
COMMERCIAL SUPERSONIC TRANSPORT AIRCRAFT AND THE DOMESTIC AIR TRAVEL MARKET.
Mar 62, 21p.

Unclassified report

Descriptors: (*Supersonic planes, Civil aviation), (*Transport planes, Civil aviation), (*Civil aviation, Management planning), Air transportation, Feasibility studies, Economics

The report presents new data on domestic air travel that are being assembled and analyzed for the purpose of forecasting the potential market for supersonic transport aircraft. There are four sections to the report. The first discusses total domestic air passenger travel and the potential market it offers for supersonic transport aircraft. The second section considers the potential domestic market under alternative assumptions of aircraft speeds, capacity and economically feasible stage distances. The third section examines the specific city pairs between which most domestic long trip air travel now occurs, as the route segments most important to supersonic aircraft flights. The fourth section presents a listing of the individual cities at which most domestic long trip air travel now originates or terminates and which, therefore, appear most likely to have supersonic transport service first.

AD-628 902 **See Fld. 13/2**

AD-629 675 **See Fld. 8/12**

Field 2-AGRICULTURE

2/2. AGRICULTURAL ECONOMICS

AD-629 139 **See Fld. 15/3**

2/4. AGRONOMY AND HORTICULTURE

AD-629 662 **See Fld. 4/2**

2/6. FORESTRY

AD-629 181 Fld. 2/6, 15/2
CFSTI Prices: HC $30.90 MF $1.50
AGRICULTURAL RESEARCH SERVICE WASHINGTON D C
VEGETATION OF SOUTHEAST ASIA STUDIES OF FOREST TYPES 1963-1965,
by Llewelyn Williams. Dec 65, 313p. Rept. no. cr-49-65,
Contract arpa order-424,

Unclassified report

Descriptors: (*Trees, Southeast Asia), (*Southeast Asia, Trees), (*Plants (Botany), Southeast Asia), Agriculture, Thailand, Vietnam, Cambodia, Laos, Rainfall, Cereals, Growth, Ecology, Climatology, Maps, Meteorological maps, Tropical regions, Defoliants, Hazards, Meteorological parameters, Rivers, Mountains, Texas, Puerto Rico, Photographs, Indexes, Bibliographies

Contents: Southeast Asia-Summary; Thailand-Filed investigations; Classification of Tropical forests; Criteria for classification; Climax formations; Southeast Asia - Forest types; Evergreen forests; Deciduous forests; Ground studies of Thai forests; Aerial studies of tropical forests; Tests with defoliants in Thailand; Hazardous vegetation; Southeast Asia Physiographic, climatic

and other features; Thailand; Vietnam; Cambodia; Laos; Southeast Asia, Puerto Rico and Texas - Analogous features; Southeast Asia - Forests, illustrations; Maps and illustrations; Bibliography - Annotated; General Index.

Field 3-ASTRONOMY AND ASTROPHYSICS

3/1. ASTRONOMY

AD-629 047 Fld. 3/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
GENERATION OF THE LUNAR EPHEMERIS ON AN ELECTRONIC COMPUTER.
Technical rept.,
by M. E. Ash. 24 Aug 65, 33p. Rept. no. TR-400,
Contract AF 19 (628)-5167, Proj. AF-649L
ESD TDR-65-418

Unclassified report

Descriptors: (*Moon, Ephemerides), (*Ephemerides, Moon), (*Programming (Computers), Astronomical data), Equations of motion, Brownian motion, Numerical analysis, Integration

This report describes the method of integration that is used in a Lincoln Laboratory computer program (the Planetary Ephemeris Program) to determine as functions of time the position and velocity of the Moon and the partial derivatives of these quantities with respect to initial conditions. The method consists of numerically integrating the differential equations for the differences between the positions, velocities and partial derivatives in the true lunar orbit and in Brown's mean lunar orbit. (Author)

AD-629 116 Fld. 3/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
A GEOLOGICAL MODEL OF MARE HUMORUM.
Environmental research papers,
by Luciano B. Ronca. 18 Mar 65, 13p. Rept. no. AFCRL-ERP-156,AF RL-65-839
Proj. AF-8602, Task 860201,

Unclassified report

Availability: Published in Icarus, v4 n4 p390-5 Sep 1965. Copies to DDC users only.

Descriptors: (*Moon, Terrain models), (*Terrain models, Moon), Extraterrestrial topography, Models (Simulations), Astronomy

A model of Mare Humorum is presented as a working hypothesis. The model was deduced by combining theories and observations of the origin of the vittae (rays), rills, wrinkle ridges, and faults. In this model, Mare Humorum consists of a basin which subsided by tilting and normal faulting. The tilting is deduced from the observation of the partial flooding of Gassendi and Dopplemeyer, on the north and south shores of the Mare, respectively. The faulting is deduced from the location of several linear features and the vittae, which are interpreted as being loci of sublimate deposition along infra-mare faults. The basin is filled by volcanic material which behaves incompetently with respect to the basement. Wrinkle ridges are features of the volcanic cover due to compression resulting from the subsidence. Rilles are features of the competent basement material, due to tension stresses occurring at the hinge areas of the subsiding basin and may be grabens and/or superficial dikes. The crustal weakness responsible for Mare Humorum could have originated by impact, but endogenous tectonism is the primary factor responsible for the present structure. (Author)

AD-629 130 Fld. 3/1, 9/2
CFSTI Prices: HC $8.60 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
GENERATION OF PLANETARY EPHEMERIDES ON AN ELECTRONIC COMPUTER.
Technical rept.,
by M. E. Ash. 2 Jun 65, 86p. Rept. no. TR-391,
Contract AF 19 (628)-500, Proj. AF-649L
ESD TDR-65-228

Unclassified report

Descriptors: (*Ephemerides, Planets),)*Planets, Ephemerides), (*Programming (Computers), Astronomical data), Moon, Equations of motion, Numerical analysis, Intergration, Relativity theory

A computer program, called the Planetary Ephemeris Program (PEP), is being written at Lincoln Laboratory. The purpose of the program is to improve planetary and lunar ephemerides using the results of radar and optical observations. In this report, the author derives the differential equations that are numerically integrated in PEP to determine as functions of time the positions and velocities of the planets, of the Earth-Moon barycenter and of the Moon, and the partial derivatives of these positions and velocities with respect to initial conditions, masses and other parameters. Newtonian theory with the usual unrigorous general relativistic corrections is employed. The equations of motion and the equations for the partial derivatives with respect to initial conditions are presented in the form needed in the Encke's method of integration used in PEP. (Author)

AD-628 913 **See Fld. 8/7**

AD-629 425 **See Fld. 22/1**

3/2. ASTROPHYSICS

AD-629 036 Fld. 3/2
PALOMAR OBSERVATORY PASADENA CALIF
STUDIES OF THE PECULIAR A STARS. II. THE SILICON-ABUNDANCE ANOMALY,
by Leonard Searle, and Wallace L. W. Sargent.
26 Oct 63, 21p. Contract AF 49 (638)-21, Proj. AF-9774, Task 977401,
AFOSR 65-2154

Unclassified report

Availability: Published in The Astrophysical Journal v139 n3 p793-812 1 Apr 1964. Copies to DDC users only.

Descriptors: (*Stars, Silicon), (*Silicon, Stars), Astrophysics, Spectroscopy, Chemical analysis

AD-629 098 Fld. 3/2
CFSTI Prices: HC $1.10 MF $0.50
KING'S COLL UNIV OF LONDON (ENGLAND)
1965 CONFERENCE ON GENERAL RELATIVITY AND GRAVITATION.
Final scientific rept.,
by H. Bondi. 13 Dec 65, 5p. Contract AF-EOAR-21-65,

Unclassified report

Descriptors: (*Relativity theory, Symposia), (*Gravity, Symposia), Astrophysics, Quantum mechanics, Great Britain

AD-629 114 Fld. 3/2, 12/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
COMPARISONS OF POWER SPECTRUMS OF ARTIFICIAL TIME SERIES WITH SPECTRUM OF A SOLAR PLAGE INDEX.
Environmental research papers,
by Ralph Shapiro. 28 Jan 65, 10p. Rept. no. AFCRL-ERP-168 ,AFCRL-66-50
Proj. AF-8604, Task 860404,

Unclassified report

Availability: Published in Journal of Geophysical Research, v70 n15 p3581-6 Aug 1 1965. Copies to DDC users only.

Descriptors: (*Statistical analysis, Solar spectrum), (*Solar spectrum, Statistical analysis), Solar disturbances, Sunspots, Harmonic analysis

A number of experiments are described whose purpose was to determine whether peaks in power spectrums of time series of solar indices reflect a tendency for equidistant separation in longitude of solar active regions or are produced by the analysis technique. From comparisons of power spectrums of artificial time series with the spectrum of a solar plage index it is clear that there is no appreciable tendency for equidistant spacing of active regions. (Author)

AD-629 233 Fld. 3/2
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
3P (6)-3P (5)3D TRANSITIONS OF FE IX AND NI XI IN THE SOLAR SPECTRUM,
by E. Alexander, U. Feldman, B. S. Fraenkel, and S. Hoory. 1965, 3p. Contract AF-EOAR-70-64,
AFOSR 65-2596

Unclassified report

Availability: Published in Nature, v206 n4980 p176 Apr 10 1965. Copies to DDC users only.

Descriptors: (*Iron, Solar spectrum), (*Nickel, Solar spectrum), (*Solar spectrum, Ultraviolet radiation), Solar radiation, Line spectrum, Ultraviolet spectroscopy, Israel

The strong solar lines at 171.1 and 148.5 A were classified as the 3p (6) (1)S (O) - 3p (5)3d (1)P (1) transition of iron 1X and nickel X1; the classification was obtained by use of the technique of classification between different degrees of ionization.

AD-629 289 Fld. 3/2
STANFORD UNIV CALIF RADIO ASTRONOMY INST
INSTRUMENTS, SOLAR PHYSICS, EXTRAGALACTIC STUDIES, GALACTIC STUDIES AND OCCULATIONS,
by R. N. Bracewell. 1964, 3p. Rept. no. Reprint-R37,
Contract AF 49 (638)-1059,
AFOSR 65-2256

Unclassified report

Availability: Published in Astronomical Journal v69 n10 Dec 1965. Copies to DDC users only.

Descriptors: (*Radio astronomy, Instrumentation), California, Scientific personnel, Solar atmosphere, Galaxies, Scientific research

AD-629 290 Fld. 3/2
STANFORD UNIV CALIF RADIO ASTRONOMY INST
STRUCTURE OF THE CENTRAL COMPONENT OF CENTAURUS A,
by A. G. Little, D. D. Cudaback, and R. N. Bracewell. 1964, 4p. Rept. no. Reprint-R35,
Contract AF 18 (603)-53,
AFOSR 65-2270

Unclassified report

Availability: Published in Proceedings of the National Academy of Sciences v52 n3 p690-1 Sep 1964. Copies to DDC users only.

Descriptors: (*Stars, Radio astronomy), (*Radio astronomy, Stars), Astronomical data

AD-629 335 Fld. 3/2
CENTER FOR RADIOPHYSICS AND SPACE RESEARCH CORNELL UNIV ITHACA N Y

RADIOMETRIC OBSERVATIONS OF JUPITER AT 430 MC/S,
by Harry E. Hardebeck. 21 Jan 65, 1p. Contract AF 49 (638)-1156,
AFOSR 65-2812

Unclassified report

Availability: Published in The Astrophysical Journal, v141 n2 15 Feb 1965. Copies to DDC users only.

Descriptors: (*Radio astronomy, Jupiter (Planet)), (*Jupiter (Planet), Radio astronomy), Extraterrestrial radio waves, Ultrahigh frequency, Radiometers, Optical scanning

AD-629 338 Fld. 3/2
ARECIBO IONOSPHERIC OBSERVATORY PUERTO RICO
OCCULTATION OF TAURUS-A BY THE SOLAR CORONA AT 430 MC/S IN JUNE 1964,
by M. R. Kundu. 1964, 6p. Contract AF 49 (638)-1156,
AFOSR 65-2268

Unclassified report

Availability: Published in Nature v205 n4972 p683-4 13 Feb 1965. Copies to DDC users only.

Descriptors: (*Radio astronomy, Solar corona), (*Solar corona, Radio astronomy), (*Galaxies, Radio astronomy), Celestial mechanics, Extraterrestrial radio waves, Ultrahigh frequency, Atmospheric refraction

AD-629 343 Fld. 3/2
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF SPACE SCIENCE LAB
HIGH-RESOLUTION STUDIES OF TYPE III SOLAR EMISSION AT 11.4-METER WAVELENGTH,
by W. C. Erickson. 31 Jan 63, 11p. Contract AF 49 (638)-561,

Unclassified report

Availability: Published in Journal of Geophysical Research, v68 n10 p3169-79 May 15 1963. Copies to DDC users only.

Descriptors: (*Solar radiation, Radio waves), (*Radio astronomy, Sun), (*Sun, Radio astronomy), High frequency, Extraterrestrial radio waves, Astrophysics, Instrumentation

Enhanced solar radio emission was observed during May and June 1962 at a wavelength of 11.4 meters (26.3 Mc/s) by the Clark Lake antenna (a full description of the antenna is in press). Two emission regions were observed. They were of large angular size (about 2 to 3 solar radii in diameter), they fluctuated rapidly in amplitude (periods about 4 seconds or less), and they appeared to rotate with the sun and to have been located at distances of about 2.0 and 2.5 solar radii from the sun's center. Correlation with sweptfrequency data indicates that most or all of the observed emission was of spectral type III. On the basis of these data, plasma levels corresponding to densities of 8.5 x 1000000 electrons/cc are estimated to have been at heights of 2.0 and 2.5 solar radii over the active regions. These estimates agree well with the coronal streamer model of Newkirk. The average brightness distribution of one of the emission regions is found to be consistent with the 'core and halo' model proposed by Weiss and Sheridan. (Author)

AD-629 366 Fld. 3/2
STANFORD UNIV CALIF RADIO ASTRONOMY INST
OBSERVATIONS OF THE SIX MOST INTENSE RADIO SOURCES WITH A 1.0° FAN BEAM,
by A. R. Thompson, and T. Krishnan. 14 Jul 64, 15p. Rept. no. R36,
Contract AF 49 (638)-1375, Proj. AF-9767 Task 976702,
AFOSR 65-2952

Unclassified report

Availability: Published in Astrophysical Journal v141 n1 p19-33 Jan 1, 1965. Copies to DDC users only.

Descriptors: (*Radio astronomy, Galaxies), (*Galaxies, Radio astronomy), Stars, Nebulae, Interferometers, Astronomical data

Observations of the radio sources Cassiopeia A, Taurus A, the Orion Nebula, the Omega Nebula, Sagittarius A, and Cygnus A are made with a beam width of 1.0' in the east-west direction using the Stanford compound interferometer.

AD-629 376 Fld. 3/2
PALOMAR OBSERVATORY PASADENA CALIF
EFFECTIVE TEMPERATURES AND GRAVITIES OF AP, AM, AND NORMAL A-TYPE STARS,
by Bodo Baschek, and J. B. Oke. 30 Nov 64, 10p. Contract AF 49 (638)-1323,
AFOSR 65-2773

Unclassified report

Prepared in cooperation with Mount Wilson Observatory, Pasadena, Calif., Carnegie Institution of Washington, D. C., California Inst. of Tech., Pasadena.

Availability: Published in The Astrophysical Journal v141 n4 p1404-10 15 May 1965. Copies to DDC users only.

Descriptors: (*Stars, Spectroscopy), Temperature, Gravity, Optical properties, Astrophysics

Effective temperatures and gravities are determined for selected Ap, Am, and normal A-type stars and it is found that the colors are modified substantially by the presence of abnormally strong metallic lines. The gravities of all stars, with one exception, are those expected of main-sequence stars. The Am stars in the Hyades are systematically hotter than the corresponding normal stars. (Author)

AD-629 412 Fld. 3/2
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CORRELATION RECEIVER FOR THE STUDY OF COSMIC RADIAL RADIATION AT LAMBDA = 21 CM,
by N. S. Kardashev, and B. M. Chikhachev. 20 Jan 66, 11p. Rept. no. FTD-TT-65-1386, TT 66-60718

Unclassified report

Unedited rough draft trans. of Moscow Univ. Gosudarstvennyi Astronomicheskii Institut. Soobshcheniya (USSR) n126 p66-71 1963.

Descriptors: (*Radio astronomy, Radio telescopes), (*Radio telescopes, USSR), Radio receivers, Phase measurement, Extraterrestrial radio waves

AD-629 437 Fld. 3/2, 7/4
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
ATOMIC WAVE FUNCTIONS, COLLISION CROSS-SECTIONS, AND TRANSITION PROBABILITIES OF FE IONS,
by T. K. Krueger, and S. J. Czyzak. 31 Mar 64, 40p. Rept. no. ARL-65-190,

Unclassified report

Availability: Published in Memoirs of Royal Astronomical Society v69 p145-82 1965. Copies to DDC users only.

Descriptors: (*Iron, Ions), (*Solar spectrum, Iron), (*Wave functions, Iron), (*Electron transitions, Iron), Field theory, Selection rules, Probability, Atomic energy levels, Tables

Since atomic wave functions of Fe ions are of astrophysical importance, many of these (Fe v-Fe xvii) were calculated by employing the Hartree-Fock self-consistent field method with exchange. The wave functions are supplied in tabular form. Probabilities were calculated for forbidden transitions in Fex, xi, xiii, xiv and xv, some of which are observed in the solar corona; also the energy levels and forbidden transition probabilities for Fe xiii were estimated. Preliminary cross-section calculations, involving only p-waves, for forbidden transitions in Fe xi, xii and xiii were made and the problems involved in these calculations are discussed. For allowed transitions in Fe xv and Fe xvi probabilities have been calculated and collision cross-sections for the latter ion only. The calculated results presented in this paper are discussed in some detail. (Author)

AD-629 627 Fld. 3/2
CFSTI Prices: HC $2.00 MF $0.50
LOCKHEED-CALIFORNIA CO BURBANK
EXPEDITION TO THAILAND FOR THE NOVEMBER 23, 1965 ANNULAR ECLIPSE.
Final rept. 1 Sep-1 Dec 65,
by L. G. Stoddard. Jan 66, 31p. Rept. no. LR-19398,
Contract AF 19 (628)-5714, Proj. AF-7600, Task 760008,
AFCRL 66-103

Unclassified report

Descriptors: (*Solar eclipses, Photography), (*Moon, Solar eclipses), Astrophysics, Lunar environment, Photographic analysis, Photographic equipment, Thailand

The specific scientific goal, successfully achieved, was to obtain observational data useful for improving knowledge of the moon's shape. Observational data was obtained at Chiengmai, Thailand both photographically and with a photoelectric scanner of the geometry of the moon silhouetted against the circular solar disk. This report describes the general aspects of the expedition, the equipment used and results obtained. Pertinent data of the eclipse itself is also included. (Author)

AD-629 682 Fld. 3/2
CALIFORNIA UNIV BERKELEY DEPT OF ASTRONOMY
STUDIES IN STELLAR EVOLUTION. II. LITHIUM DEPLETION DURING THE PRE-MAIN-SEQUENCE CONTRACTION,
by Peter Bodenheimer. 4 Mar 65, 11p. Contract AF-AFOSR-171-63,
AFOSR 66-0383

Unclassified report

See also AD-629 966.

Availability: Published in The Astrophysical Journal, v142 n2 p451-61 15 Aug 1965. Copies to DDC users only.

Descriptors: (*Stars, Nuclear reactions), (*Astrophysics, Stars), Equations of state, Lithium, Abundance, Galaxies

Pre-main-sequence theoretical evolutionary tracks have been calculated for configurations of six different masses between 500 and 1200 solar masses in order to determine the extent to which lithium is destroyed in the convective envelopes as a function of mass. The evolutionary sequences are started with an initial amount of lithium based on observed abundances. At each time step in the calculation, reaction rates are calculated in detail, and the resulting chemical compositions are homogenized over the convective envelope. The evolutionary tracks are carried over to the main sequence in order to provide a basis for comparison with recent observations of lithium abundances in main-sequence stars in the Hyades cluster and in the solar neighborhood. The theoretical depletion as

a function of position on the main sequence agrees well with the general trend of the observations, for calculations based both on the solar mass-luminosity relation and on the mass-luminosity relation that has been observed for the Hyades. (Author)

AD-628 887 See Fld. 4/1

AD-629 087 See Fld. 8/14

AD-629 115 See Fld. 4/1

AD-629 315 See Fld. 4/1

AD-629 696 See Fld. 4/1

3/3. CELESTIAL MECHANICS

AD-629 117 Fld. 3/3
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
THE GENERAL CIRCULATION OF THE SOLAR ATMOSPHERE AND THE MAINTENANCE OF THE EQUATORIAL ACCELERATION.
Environmental research papers, revised ed.,
by Fred Ward. 4 Sep 64, 20p. Rept. no. AFCRL-ERP-159,AFCRL-65-871
Proj. AF-8666, Task 866601,
Unclassified report

Revision of manuscript submitted 10 Jun 64.

Availability: Published in The Astrophysical Journal v141 n2 p534-47 15 Feb 65. Copies to DDC users only.

Descriptors: (*Solar atmosphere, Rotation), (*Celestial mechanics, Sun), (*Sun, Celestial mechanics), Astrophysics, Fluid mechanics

Many theories have been advanced to explain how the equatorial acceleration of the Sun originated or is maintained. These range from Cowling's 'fossil' rotation theory which has the excess velocity left from the birth of the solar system, to Rander's conclusion that polar heating leads necessarily to an increase in rotational velocity toward the equatorial plane. But all these theories assume that the large-scale fluid motions are symmetric about the rotational axis. However, recent hydrodynamical model experiments show how rotation can significantly alter such motions. Consideration of the solar rotation and the magnitude and character of its latitudinal radient leads to the more likely hypothesis that the general circulation of the solar atmosphere is not axially symmetric, but consists of wave motions, in which large components of fluid velocities are along spherical surfaces. These waves (or eddies) transport angular momentum equatorward from high latitudes along these spherical surfaces by horizontal exchange processes. The analysis of Greenwich sunspot data for one sunspot cycle (1935-1944) supported the above hypothesis. The data for two more sunspot cycles have now been analyzed and verifies the previous result in all major respects. Moreover, if the transport of angular momentum by these eddies were to cease and all other processes were to continue unabated, the zone between 27.5 degrees would go to solid rotation (at the velocity of its boundaries) in less than four solar rotations. (Author)

AD-629 334 Fld. 3/3
ARECIBO IONOSPHERIC OBSERVATORY PUERTO RICO
A RADAR DETERMINATION OF THE ROTATION OF THE PLANET MERCURY,
by G. H. Pettengill, and R. B. Dyce. 1965, 4p.
Contract AF 49 (638)-1156,
AFOSR 65-2868
Unclassified report

Availability: Published in Nature v206 n4990 p1240 19 Jun 1965. Copies to DDC users only.

Descriptors: (*Mercury (Planet), Rotation), (*Celestial mechanics, Mercury (Planet)), (*Radar scanning, Mercury (Planet)), Astrophysics

AD-628 934 See Fld. 12/1

Field 4-ATMOSPHERIC SCIENCES

4/1. ATMOSPHERIC PHYSICS

AD-628 884 Fld. 4/1
BARTOL RESEARCH FOUNDATION FRANKLIN INST SWARTHMORE PA
SURVEY OF COSMIC-RAY INTENSITY IN THE LOWER ATMOSPHERE.
Revised ed.,
by H. Coxell, M. A. Pomerantz, and S. P. Agarwal. 22 Sep 65, 12p. Contract Nonr-3777(00), AF 19(604)-8061
Unclassified report

Revision of manuscript submitted 25 May 65.

Availability: Published in Journal of Geophysical Research, v71 n1 p143-54 Jan 1 1966. Copies to DDC users only.

Descriptors: (*Cosmic rays, Troposphere), (*Troposphere, Cosmic rays), Neutrons, Monitors, Airborne, Terrestrial magnetism, Particle trajectories, Maps

Observations of the intensity of the nucleonic component were obtained with an airborne neutron monitor in a worldwide survey extending from the equator to the north and south geomagnetic poles. The data were reduced to a standard pressure altitude (500 mm of Hg), and the effects of temporal variations were removed by anormalization procedure involving four ground-based neutron monitor stations distributed over a wide range of latitude. Representation of the results in the form of an isocosm map revealed general agreement with the Quenby and Wenk calculations of threshold rigidities. Discrepancies are attributable to the inexactness of the approximation adopted for taking into account the effects of the penumbra. The location of the cosmic-ray equator, determined at seven points, was in accordance with calculations using the sixth-order expansion of the geomagnetic potential. The variation in intensity along the equator was in agreement with earlier results obtained during a different phase of the solar cycle. Measurements in the arctic and antarctic regions reveal that, during a period of extreme solar cycle modulation, the intensities in the northern and southern polar caps were equal within less than 0.5%. The latitude dependence of the atmospheric attenuation length of the nucleonic component, L, was determined from observations of the dependence of intensity upon altitude. (Author)

AD-628 887 Fld. 4/1, 3/2
CFSTI Prices: HC $4.00 MF $0.75
GRUPO DE RADIO-ASTRONOMICA UNIVERSIDADE MACKENZIE SAO PAULO (BRAZIL)
A COMBINED REPORT ON GENERAL WORKS AND PRELIMINARY STUDIES ON SOLAR RADIO EMISSION AND SOLAR-TERRESTRIAL RELATIONSHIPS THROUGH V. L. F. PROPAGATION IN THE IONOSPHERE.
Annual rept. no. 2, Sep 65-Jan 66,
by Pierre Kaufmann. Jan 66, 108p. Rept. no. GRAM-10,
Contract DA-ARO-49-092-65-G76 Proj. DA-2M014501B53B-00-015-LA, DA2M014501-B53B-00-016-LA
Unclassified report

Descriptors: (*Radio astronomy, Solar radiation), (*Solar radiation, Geophysics), (*Geophysics, Solar radiation), Solar eclipses, Terrestrial magnetism, Electromagnetic waves, Very low frequency, Ionospheric propagation, Radio telescopes, Brazil

This is the first annual report on two separate grants, Solar Microwave Radio Emission and VLF Atmospheric Studies. Status and descriptions of the projects, of the Umuarama Radio Observatory, and of the data acquisition system are included. Solar observations on 300 MHz, geomagnetic and geoelectric program as well as plans for measurements at Bage, Brazil during the November 1966 Solar Eclipse are given. Notes and graphs on Residual elevation angle vs. altitude, Monthly mean solar elevation angles and azimuths, Displacement of longitude for a considered sunrise time at several altitudes, along different latitudes are included. Following are also part of the report: (1) Electromagnetic Meaning of Flux Density Measured by Radio Telescope Antennas (2) Results obtained with VLF Atmospherics Measurements (3) Installation of the Geomagnetic Data Monitoring Station. Diagrams, Graphs and Tables illustrate the data collected thus far in the first year of this five-year project. (Author)

AD-628 893 Fld. 4/1, 8/14, 20/9, 18/3
CFSTI Prices: HC $3.60 MF $0.50
RAND CORP SANTA MONICA CALIF
EQUATORIAL TRANSMISSION OF GEOMAGNETIC MICROPULSATIONS THROUGH THE IONOSPHERE AND LOWER EXOSPHERE,
by E. C. Field, and C. Greifinger. Feb 66, 31p.
Rept. no. RM-4858,
Unclassified report

Descriptors: (*Magnetohydrodynamics, Upper atmosphere), (*Upper atmosphere, Magnetohydrodynamics), (*Terrestrial magnetism, Upper atmosphere), Ionosphere, Exosphere, Magnetic fields, Oscillation, High altitude, Nuclear explosions, Detection, Geophysics

Part of a continuing study on the detection of high-altitude nuclear explosions. The Memorandum reports on low-frequency hydromagnetic waves similar to those generated by such explosions, and detectable by ground-current measurements at worldwide locations. Particular attention is given to the response of the ionosphere to such low-frequency hydromagnetic disturbances. The purpose is to separate the effects of the medium from those of the source on the transmitted disturbance. (Author)

AD-628 971 Fld. 4/1, 20/14
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE RELATION BETWEEN THE THERMODYNAMIC STATE OF THE ATMOSPHERE AND RADAR ECHOES FROM A CLEAR SKY.
Research translation,
by E. M. Salman, and G. B. Brylev. Dec 65, 10p.
Rept. no. T-R-530,
Contract AF 19 (628)-3880,
TT 66-60676
Unclassified report

O Sviazi Mezhdu Termodinamicheskim Sostoianiem Atmosfery i Radiolokatsionnymi Otrazheniiami ot Iasnogo Neba, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n159 p85-8 1964.

Descriptors: (*Radar echo areas, Convection (Atmospheric)), (*Convection (Atmospheric), Radar echo areas), Clear air turbulence, Thermodynamics, Atmospheric sounding, USSR

An analysis of the results of aerological and meteorological observations shows that a discrete-coherent radar echo is found in thermal convection. A correlation is noted between the maximum height of occurrence of this radar echo and the buoyancy on days with free convection. (Author)

AD-629 031 Fld. 4/1, 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS
ON THE STABILITY OF BAROCLINIC FLOWS AS A FUNCTIONAL OF THE VELOCITY PROFILE.

Revised ed.,
by Joseph Pedlosky. 17 Nov 64, 9p. Contract AF-AFOSR-492-64, Proj. AF-9749, Task 974901,
AFOSR 65-2115

Unclassified report

Revision of manuscript submitted 28 Aug 64.

Availability: Published in Journal of Atmospheric Sciences, v22 n2 p137-45 Mar 1965. Copies to DDC users only.

Descriptors: (*Atmospheric motion, Fluid mechanics), (*Fluid mechanics, Atmospheric motion), Fluid flow, Stability

The stability of all baroclinic flows whose mean state consists of a uniform vertical shear (Eady's problem) plus a small but arbitrary deviation in the zonal velocity is obtained as a functional of the velocity profiles. It is shown that the growth rate of the disturbances is not everywhere an analytic function of the deviation of the profile from uniform shear. The change of stability due to the velocity deviation is obtained by a study of the growth rate at the neutral curve of Eady's problem. Only the vertically antisymmetric and the horizontally symmetric component of the velocity deviation affects the stability of the flow. For large wavelengths it is shown that only the horizontal curvature of the velocity profile alters the stability, and a general condition for a long wave stability cut off is obtained in terms of the curvature. If the curvature is negative the flow is stabilized. The effect of the velocity deviation on the structure of the amplified eigenfunction is displayed. An example, in which the mean flow is horizontally asymmetric about the horizontal mid-point is presented. The Reynolds stress of the amplified baroclinic wave is computed and its vertical structure shown to have a boundary layer character while transporting, horizontally, mean zonal momentum toward the current maximum, increasing the kinetic energy of the mean flow. (Author)

AD-629 064 Fld. 4/1, 7/4
CFSTI Prices: HC $2.00 MF $0.50
MCGILL UNIV MONTREAL (QUEBEC) UPPER ATMOSPHERE CHEMISTRY GROUP
KINETICS OF ATMOSPHERIC GASES.
Final rept., Mar 62-Aug 65,
by H. I. Schiff. Nov 65, 49p Rept. no. UACG-5-65,
Contract AF 19 (628)-308, Proj. AF-5633, Task 563309,
AFCRL 66-1

Unclassified report

Descriptors: (*Atmosphere, Chemical reactions), (*Kinetic theory, Atmosphere), (*Chemiluminescence, Atmosphere), Mass spectroscopy, Atoms, Molecules, Recombination reactions, Diffusion, Nitrogen, Oxygen, Reaction kinetics

Summaries are presented on work already published in the literature. These include kinetics of atom and excited molecule reactions, and recombinations; absolute quantum yield measurements; and diffusion coefficients. The following summarizes work yet to be published. The reaction of O atoms with aluminum vapor was found to produce chemiluminescent glows which consisted of a continuum, whose intensity distribution was similar to that obtained from rocket experiments. The reaction of O atoms with trimethyl aluminum (TMA) also produced a chemiluminescent continuum. No resonance radiation corresponding to A10 emission could be produced by irradiating the reaction products with continuum or discrete light sources. The reactions of a number of metalorganic compounds with active nitrogen produced glows which consisted of a number of bands, some of which have not yet been identified as well as lines from excited metal atoms. The rate of reaction of TMA with molecular oxygen was studied using the mass spectrometric technique. The rate constant was found to be (2 = 0.3) x 10 to the minus 16th power cc/molecule sec. The rate of the reaction of TMA with atomic oxygen was found to be greater than could be measured with this technique and must therefore occur at close to collision frequency. (Author)

AD-629 081 Fld. 4/1, 20/6
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
EVALUATION OF INFRARED EMISSION OF CLOUDS AND GROUND AS MEASURED BY WEATHER SATELLITES.
Environmental research papers,
by Clifford D. Kern. Nov 65, 111p. Rept. no. AFCRL-ERP-155,AFCRL-65-840
Proj. AF-7628, Task 762805,

Unclassified report

Descriptors: (*Meteorological satellites, Infrared scanning), (*Infrared radiation, Meteorological phenomena), Clouds, Earth (Planet), Radiation (Heat transfer), Atmosphere, Absorption, Water vapor, Ozone, Carbon dioxide

Infrared signals received in the 8 to 12 micron window by weather satellites and aircraft depend, in clear air, on surface temperature, atmospheric interference, and surface emissivity. For the latter, the literature contains very different data for clouds, water, rocks, etc. This paper discusses three methods that were tried for securing correct emissivity data: (1) Testing the reflectivity of polished rock samples in an infrared spectrograph for 5 to 16 micron wavelengths. Using Kirchhoff's law, this method yields emissivities for near-normal incidence. (2) Measuring the emissivity of many surfaces directly, using an 8- to 13-micron-sensitive radiometer and an aggregate (called an emissivity box). (3) Evaluating data obtained on a summer noontime flight of Tiros over the Mediterranean and the Sahara. The Mediterranean served for calibration of the 8 to 13 micron Tiros radiometer and the atmospheric effects. The large discrepancy between the Tiros temperatures of the Sahara and the expected true desert-surface temperatures can only be explained as caused by a substantial deviation from blackbody emissivity. This deviation seems to be caused by the 9 to 10 micron reflection of quartzites. (Author)

AD-629 115 Fld. 4/1, 3/2, 7/2
UTAH STATE UNIV BEDFORD MASS CONCORD RADIANCE LAB
OBSERVATION OF THE DELTA NU=1 SEQUENCE OF OH PRODUCED IN THE H + 03 REACTION.
Environmental research papers,
by A. T. Stair Jr., J. P. Kennealy, and S. P. Stewart. 11 Jun 65, 9p. Contract AF 19 (628)-251, Proj. AF-8658, Task 865803,
AFCRL 65-881 ,AFCRL ERP-160

Unclassified report

Availability: Published in Planetary and Space Science v13 p1005-8 1965. Copies to DDC users only.

Descriptors: (*Hydroxides, Spectroscopy), (*Upper atmosphere, Hydroxides), Hydrogen, Ozone, Chemical reactions, Dipole moments, Interferometers, Night sky, Spectroscopy

The H + O3 reaction was studied using a typical steady-state flow system in which the total pressure was 4 torr. A modulated 100 W 2450-M/sec microwave discharge was the source of hydrogen atoms. Ozone was synthesized from pure O2 in a high-voltage discharge, adsorbed and stored on silica gel at -78C, and eluted at -40C with helium into the reaction cell. The OH emission spectrum, which contains most of the delta nu = 1 and 2 sequences, is shown corrected for instrument response. The maximum path difference was only 1 mm, which is not sufficient to resolve the delta nu = 1 sequence well enough to obtain the integrated intensities of the various vibrational transitions. However, the resolution is sufficient to assign almost all of the observed structure to OH. The delta nu = 2 sequence was larger by a factor of about 10 before removing the instrument response; consequently, the identification in this region was also unambiguous. Under these conditions there is no apparent intensity structure in the spectra at 2.9 and 3.3 microns as observed in the airglow.

AD-629 119 Fld. 4/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
TIME AND ALTITUDE DEPENDENCE OF 55-MEV TRAPPED PROTONS, AUGUST 1961 TO JUNE 1964.
Environmental research papers, Revised ed.,
by Robert C. Filz, and Ernest Holeman. 30 Aug 65, 22p. Rept. no. afcrl-ERP-166,AFCRL-65-917
Proj. AF-8600, Task 860004,

Unclassified report

Revision of manuscript submitted 26 Jul 65. Prepared in cooperation with Emmanuel Coll., Lexington, Mass. Physics Research Div.

Availability: Published in Journal of Geophysical Research v70 n23 p5807-22 1 Dec 65. Copies to DDC users only.

Descriptors: (*Protons, Van Allen radiation belt), (*Van Allen radiation belt, Protons), (*Space environmental conditions, Protons), Atlantic Ocean, Atmospheric sounding, Scientific satellites, Radiation measurement systems, Nuclear explosions

Measurements of 55-Mev omnidirectional trapped protons detected in a small region of the South Atlantic by nuclear emulsions flown on recoverable oriented Air Force satellites are reported for the period August 1961 to June 1964 between altitudes of 221 and 736 km.

AD-629 121 Fld. 4/1, 18/8
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
TIME DELAYS BETWEEN THE INTENSITY VARIATIONS OF THE 3914 A AND 5577 A SPECTRAL LINES IN ARTIFICIAL AURORAS.
Environmental research papers,
by G. M. Daniels, and P. Newman. 29 Jul 65, 11p. Rept. no. AFCRL-ERP-164 ,AFCRL-65-915
Proj. AF-4603, Task 460309,

Unclassified report

Availability: Published in Journal of Geophysical Research v70 n23 p5861-65 1 Dec 1965. Copies to DDC users only.

Descriptors: (*Artificial radioactivity, Aurorae), (*Aurorae, Artificial radioactivity), (*Nuclear explosions, High altitude), Spectroscopy

Time delays between the intensity variations of 3914 A and 5577 A spectral lines were observed in artificial auroras generated by high-altitude nuclear explosions. An Omholt analysis of the intensity records indicated that the excitation ratio of these lines was constant for the first 1.5 seconds of the auroras. The 5577 A line lagged the spectral emission in the 6500 A to 6570 A region in a similar manner. (Author)

AD-629 123 Fld. 4/1, 20/6
CFSTI Prices: HC $6.00 MF $1.25
JOHANNES GUTENBERG UNIVERSITAET MAINZ (WEST GERMANY)
TABLES RELATED TO LIGHT SCATTERING IN A TURBID ATMOSPHERE. VOLUME II.
Special repts.,
by B. Braun, E. deBary, and K. Bullrich. Sep 65, 236p. Contract AF 61 (052)-595, Proj. AF-7621, Task 762103,
AFCRL SR-33 ,AFCRL 65-710-Vol-2

Unclassified report

See also AD-628 874.

Descriptors: (*Atmosphere, Optics), (*Optics, Atmosphere), (*Light, Scattering), Polarization, Solar radiation, Atmospheric refraction, Aerosols, Tables

The tables present the results of computations of the intensity and the degree of polarization of sky radiation and radiation scattered by a unit volume of air containing natural aerosols. The tabulated data are based upon new values of the scattering functions i sub 1 and i sub 2 and the scattering cross sections k, derived using the Mie theory with m = 1.5. In the case of primary scattering of radiation, the results are valid for a turbid atmosphere. The tables of the scattering coefficients and optical thickness, the absolute scattering functions, the intensities, and the degrees of polarization are computed for various wavelengths between 0.4 and 1.2 microns and for discrete scattering angles between 0 degrees and 180 degrees. Aerosol size distributions of the form dn (r) = c.r/v dlogr, with v = 2.5, 3.0, and 4.0, are assumed. The lower and upper limits for the size range were chosen as r sub 1 = 0.04, 0.06, and 0.08 micron and r sub 2 = 3, 5, and 10 microns respectively. (Author)

AD-629 127 Fld. 4/1, 20/6
CFSTI Prices: HC $6.00 MF $1.50
JOHANNES GUTENBERG UNIVERSITAET MAINZ (WEST GERMANY)
TABLES RELATED TO LIGHT SCATTERING IN A TURBID ATMOSPHERE. VOLUME III.
Special repts.,
by E. deBary, B. Braun, and K. Bullrich. Sep 65, 287p. Contract AF 61 (052)-595, Proj. AF-7621, Task 762103,
AFCRL SR-33 ,AFCRL 65-710-Vol-3
Unclassified report

See also AD-629 123.

Descriptors: (*Atmosphere, Optics), (*Optics, Atmosphere), (*Light, Scattering), Polarization, Solar radiation, Atmospheric refraction, Aerosols, Tables

The tables present the results of computations of the intensity and the degree of polarization of sky radiation and radiation scattered by a unit volume of air containing natural aerosols. The tabulated data are based upon new values of the scattering functions i sub 1 and i sub 2 and the scattering cross sections k, derived using the Mie theory with m = 1.5. In the case of primary scattering of radiation, the results are valid for a turbid atmosphere. The tables of the scattering coefficients and optical thickness, the absolute scattering functions, the intensities, and the degrees of polarization are computed for various wavelengths between 0.4 and 1.2 microns and for discrete scattering angles between 0 degrees and 180 degrees. Aerosol size distributions of the form dn (r) = c.r/-v dlogr, with v = 2.5, 3.0, and 4.0, are assumed. The lower and upper limits for the size range were chosen as r sub 1 = 0.04, 0.06, and 0.08 micron and r sub 2 = 3, 5, and 10 microns respectively. (Author)

AD-629 310 Fld. 4/1, 20/14
DEFENCE RESEARCH TELECOMMUNICATIONS ESTABLISHMENT OTTAWA (ONTARIO)
A NEW TECHNIQUE FOR THE MEASUREMENT OF THE ELECTRON/ION TEMPERATURE RATIO AT HIGH ALTITUDES,
by L. A. Maynard, and E. D. DuCharme. 13 Aug 65, 7p. Task y
Unclassified report

Availability: Published in Canadian Journal of Physics v43 p2088-92 Nov 1965. Copies to DDC users only.

Descriptors: (*Atmospheric sounding, Radio waves), (*Radio waves, Atmospheric sounding), (*Ionosphere, Atmospheric sounding), Electron density, Electrons, Ions, Temperature, Geophysics

The scattering of radio waves by density fluctuations within the ionosphere provides a technique for ground-based studies above the maximum of the F region. A pulse of UHF electromagnetic radiation is transmitted from the ground through the atmosphere, and the backscattered signal detected on the ground is then analyzed and used to determine various properties of the ionosphere. Ionospheric electron and ion temperatures may be derived from the spectral shape of the scattered signal, and electron density profiles may be obtained from the variation of the scattered power with height if the ratio of the electron to ion temperature is known.

AD-629 315 Fld. 4/1, 3/2, 18/8
CENTRAL RADIO PROPAGATION LAB NATIONAL BUREAU OF STANDARDS BOULDER COLO
A COMPARISON BETWEEN SOLAR X-RAY EMISSION AND VLF SUDDEN PHASE ANOMALIES,
by C. J. Chilton, J. P. Conner, and F. K. Steele. 10 Oct 65, 10p.
Unclassified report

Availability: Published in Proceedings of the IEEE, v53 n12 p2018-26 Dec 1965. Copies to DDC users only.

Descriptors: (*Solar radiation, X rays), (*X rays, Solar radiation), (*Nuclear explosions, High altitude), Very low frequency, Electromagnetic waves, Cosmic rays, Explosion effects, Atmospheric sounding, Scientific satellites

Very low frequency (VLF) sudden phase anomaly (SPA) data obtained during 1963 are presented for comparison with solar X-ray emission measurements made by VELA satellites during the same period. From the SPA data an estimate is made, for each of three flares, of the effective wavelength of monochromatic X rays that would have produced the same VLF phase effects as the actual X-ray emission. In addition, using the X-ray intensity (flux density) measurements of the satellite data and the wavelength functions obtained from the SPA data, estimates are made of the effective recombination coefficients. Furthermore, it is indicated that the VLF phase anomaly produced by X rays from a high altitude nuclear explosion can possibly be distinguished from that produced by X rays from a solar flare. (Author)

AD-629 318 Fld. 4/1
DEFENCE RESEARCH NORTHERN LAB FORT CHURCHILL (MANITOBA)
AURORAL HEIGHTS OVER CHURCHILL, MANITOBA, DURING INTERNATIONAL QUIET SOLAR YEAR,
by J. E. Hill. 21 Jun 65, 3p.
Unclassified report

Availability: Published in Canadian Journal of Physics, v43 p1917-9 Oct 1965. Copies to DDC users only.

Descriptors: (*Aurorae, Height finding), Meteorological phenomena, Manitoba, Geophysics

AD-629 326 Fld. 4/1
SASKATCHEWAN UNIV SASKATOON INST OF UPPER ATMOSPHERIC PHYSICS
AURORAL PHENOMENA IN AN INTEGRAL-INVARIANT COORDINATE SYSTEM,
by C. W. Waite. 14 Sep 65, 15p. Contract DRB-PC-69-513001,
Unclassified report

Availability: Published in Canadian Journal of Physics v43 p2319-30 Dec 1965. Copies to DDC users only.

Descriptors: (*Absorption (Physical), Aurorae), (*Aurorae, Absorption (Physical)), Terrestrial magnetism, Dipole moments, Electron density, Integrals, Canada

Isochasms of auroral phenomena, when plotted in geomagnetic dipole coordinates, are approximately circular and centered on the poles. However, a significant longitude dependence remains. The B, L and R, lambda integral-invariant coordinate systems, originated by McIlwain, have proved successful in ordering satellite measurements of the radiation belts. The spatial occurrence of aurora has been compared with isolines of L but the R, lambda system appears better suited to such plots. The evidence for a close relationship between auroral absorption and electron precipitation from the radiation belts is reviewed, and in accordance with this relationship it is shown that the R, lambda coordinate system provides a convenient longitudeindependent representation of the northern auroral absorption zone. (Author)

AD-629 332 Fld. 4/1, 20/14
CENTRAL RADIO PROPAGATION LAB BOULDER COLO
ON THE USE OF VLF MEASUREMENTS FOR OBTAINING INFORMATION ON THE LOWER IONOSPHERE (ESPECIALLY DURING SOLAR FLARES),
by D. D. Crombie. 7 Oct 65, 8p. Contract ARPA Order-183,
Unclassified report

Prepared for presentation at NATO. Advanced Study Institute on Electron Density Profiles in the Ionosphere and Exosphere.

Availability: Published in Proceedings of the IEEE p2027-34 Dec 1965. Copies to DDC users only.

Descriptors: (*Radio waves, Ionospheric propagation), (*Ionospheric propagation, Radio waves), (*Atmospheric sounding, Radio waves), Very low frequency, Probes, Electron density, Ionospheric disturbances, Solar flares

Three types of VLF propagation measurements which can be used to determine some characteristics of the lower ionosphere are described. These methods are: (1) determination of the field strength (and ideally the phase) of a continuous wave transmitter as a function of distance, (2) determination of the relative phase and amplitude of a broadband signal, such as an atmospheric, and (3) observing simultaneously the phase and amplitude of a continuous wave signal at a single point remote from the transmitter. The latter method is discussed in detail. Although it cannot alone yield much information about the normal steady-state ionosphere, it can be used to investigate changes in the electron density distribution. In this paper phase and amplitude variations observed during solar flares are used to deduce the corresponding D-region changes, both for a sharply bounded and for an exponentially varying model of the ionosphere. It is further suggested that the exponential model can be used to explain VLF observations made during Polar Cap Absorption events, as well as the somewhat anomalous diurnal variation of VLF signals observed on equatorial paths. (Author)

AD-629 336 Fld. 4/1, 20/9
CENTER FOR RADIOPHYSICS AND SPACE RESEARCH CORNELL UNIV ITHACA N Y
ENHANCEMENT OF PLASMA DENSITY FLUCTUATIONS BY NONTHERMAL ELECTRONS,
by Francis Perkins, and E. E. Salpeter. 11 Feb 65, 10p. Contract AF 49 (638)-1156, AFOSR 65-2876
Unclassified report

Availability: Published in The Physical Review, v139 n1A pA55-62 5 Jul 1965. Copies to DDC users only.

Descriptors: (*Plasma physics, Ionosphere), (*Electron density, Ionosphere), (*Ionosphere, Electron density), Ultraviolet radiation, Solar radiation, Photochemistry, Radar reflections, Atmospheric sounding

In a plasma in thermal equilibrium, the spectrum of electron density fluctuations that have a wavelength longer than the Debye length has a sharp maximum near the electron plasma frequency. In this paper, the effect of a non-Maxwellian electron velocity distribution on the spectrum of electron density fluctuations is computed for frequencies near the electron plasma frequency. The electron elocity distribution is assumed to be isotropic but not necessarily Maxwellian and the effects of electron-ion collisions are included. The results show how the presence of a small number of energetic electrons can enhance the intensity of the fluctuations near the plasma frequency, provided the Landau damping resulting from these energetic electrons is greater than both the collision damping and the Landau damping caused by the ambient electrons. The results are applied to the ionosphere radar-backscatter experiments, where the energetic electrons are photoelectrons produced by solar uv radiation. In the case of the Arecibo radar experiments, the intensity of the fluctuations near the electron plasma frequency is estimated to be enhanced at plasma frequencies greater than about 4 or 5 Mc/sec. (Author)

AD-629 337 Fld. 4/1, 20/9
CENTER FOR RADIOPHYSICS AND SPACE RESEARCH CORNELL UNIV ITHACA NY
INCOHERENT SCATTER FROM PLASMA OSCILLATIONS IN THE IONOSPHERE,
by F. W. Perkins, E. E. Salpeter, and K. O. Yngvesson. 16 Mar 65, 3p. Contract AF 49 (638)-1156,
AFOSR 65-2267

Unclassified report

Availability: Published in Physical Review Letters, v14 n15 p579-81 12 Apr 1965. Copies to DDC users only.

Descriptors: (*Incoherent scattering, Plasma oscillations), (*Plasma oscillations, Ionosphere), (*Ionosphere, Plasma oscillations), Electron density, Atmospheric sounding, Radar reflections

AD-629 356 Fld. 4/1, 20/14
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
THE ANISOTROPY OF IONOSPHERIC IRREGULARITIES DEDUCED FROM V.H.F. SCATTER MEASUREMENTS,
by G. F. Lyon. 10 Jun 65, 13p. Contract DRB-2801-18,

Unclassified report

Availability: Published in Journal of Atmospheric and Terrestrial Physics v27 p1213-21 1965. Copies to DDC users only.

Descriptors: (*Aurorae, Electromagnetic wave reflections), (*Ionospheric disturbances, Electromagnetic wave reflections), (*Electromagnetic wave reflections, Ionospheric disturbances), Atmospheric sounding, Radio waves, Very high frequency, Anisotropy

The signals received on two v.h.f. (40 Mc/s) scatter circuits of quite different geometry but viewing a common scattering region are compared. On the basis of theoretically predicted amplitude ratios derived from Moorcroft's model of an assembly of gaussoidal scatterers it is confirmed that signals of the type previously characterized as A.3 arise from nearly isotropic scatterers, while signals of the type A.1 or A.2 arise from scatterers whose axial ratio is at least 10. The suggestion is made that scatterers may exist simultaneously at more than one level and that the character of the signal observed will depend markedly on the geometry of the circuit used. The lower scattering region is probably that responsible for v.h.f. absorption. (Author)

AD-629 360 Fld. 4/1
DEFENCE RESEARCH NORTHERN LAB FORT CHURCHILL (MANITOBA)
A TEMPERATURE CURVE FOR THE UPPER ATMOSPHERE FROM 80 TO 160 KM BASED ON 3 914 A N2+ ROTATIONAL TEMPERATURES IN AURORA,
by J. H. Brandy. 25 Jun 65, 4p.

Unclassified report

Availability: Published in Canadian Journal of Physics v43 p1697-1700 Oct 1965. Copies to DDC users only.

Descriptors: (*Atmospheric temperatures, Aurorae), (*Aurorae, Atmospheric temperatures), Height finding, Nitrogen, Spectroscopy, Geophysics

Rotational temperature derived from the 3 914A N2 (+) band in aurora along with simultaneous height measurements have been obtained in 1964 and 1965 for 75 points. The heights range from 82.5 km to 161.5 km and, from the average curve plotted, the gradient above about 95 km is 4.9 degrees km. Above that height the plot appears to be linear. Large differences in temperature from the average are thought to be considerably in excess of the maximum error expected, and may indicate variations in temperature in this zone for any given height. (Author)

AD-629 430 Fld. 4/1, 20/14
CFSTI Prices: HC $4.60 MF $0.50
ILLINOIS UNIV URBANA ELECTRICAL ENGINEERING RESEARCH LAB
IONOSPHERIC RESEARCH.
Quarterly progress rept. no. 8, 1 Jul-30 Sep 65,
by H. D. Webb. 30 Sep 65, 47p. Contract DA-36-039-AMC-03703 (E), Proj. DA-3A99-20-001-04,

Unclassified report

Also includes Appendix, The Electron and Ion Temperature in the F Region of the Ionosphere, by Henry Alfonso Camargo Roncancio (Master's thesis).

Descriptors: (*Ionosphere, Atmospheric sounding), (*Atmospheric sounding, Magneto-optic effect), Moon, Electromagnetic wave reflections, Electrons, Ions, Temperature, Data processing systems

Moon reflected signals were received for 360 hours or 39 days at 150.60 mc, and for 38 days at 413.25 mc. The n x 180 degrees ambiguity can probably be resolved on all of the days. A program has been written for using the California Computer Products plotter, which can be programmed to draw grid lines, label coordinates and write captions as well as plot curves. This plotter is to be used for the Faraday rotation angle and electron content plotting. The 150.6 mc receiver is being converted into a phase-locked receiver which will automatically stay tuned to the incoming signal. A biconical spiral antenna for receiving circular polarization at 150.6 mc has been built and tested. Some modifications are required before the antenna can be made operational. A thesis for the MS. degree, dealing with electron and ion temperature measurements for October 1964, is appended. (Author)

AD-629 449 Fld. 4/1, 20/14
CFSTI Prices: HC $1.60 MF $0.50
ILLINOIS UNIV URBANA ELECTRICAL ENGINEERING RESEARCH LAB
IONOSPHERIC RESEARCH.
Quarterly progress rept. no. 9, 1 Oct-31 Dec 65,
by H. D. Webb. 31 Dec 65, 18p. Contract DA-36-039-AMC-03703 (E), Proj. DA-3A99-20-001-04,

Unclassified report

Descriptors: (*Ionosphere, Atmospheric sounding), (*Magneto-optic effect, Atmospheric sounding), (*Atmospheric sounding, Magneto-optic effect), Moon, Very high frequency, Electromagnetic wave reflections, Electron density, Data processing systems

Moon-reflected signals at 150.6 mcps were received on 34 days for a total of approximately 252 hours. Moon-reflected signals at 413.25 mcps were received on all of these days. The Faraday rotation angles have been read from the strip charts obtained at the two frequencies. The data at 413.25 mcps are used to resolve the nx180 degrees ambiguity in the 150.6 mcps data. Calculations of electron content have been completed for the observations through November 3, 1965. The California Computer Products plotter has been used to plot the Faraday rotation and electron content values for all of the data from July 1961 through 1964 and for some of the 1965 data. An Atlas of Faraday rotation and electron content data for July 1961 through 1964 is being prepared under contract AMC 01710 (E). The data have been machine plotted and the graph sheets are being prepared. A phase lock receiver has been designed and built for use in keeping the 150.6 mcps receiver 'on signal'. Two biconical, spiral, circularly polarized antennas have been designed, built and tested. These antennas were designed for use in measuring the deploolarization at the surface of the moon. (Author)

AD-629 451 Fld. 4/1
SMITHSONIAN ASTROPHYSICAL OBSERVATORY CAMBRIDGE MASS
THE TOTAL MASS OF THE EARTH'S ATMOSPHERE.
Revised ed.,
by Franco Verniani. 27 Oct 65, 7p.

Unclassified report

Revision of manuscript submitted 14 Jun 65.

Availability: Published in Journal of Geophysical Research v71 n2 p385-91 Jan 15 1966. Copies to DDC users only.

Descriptors: (*Atmosphere, Volume), Barometric pressure, Height finding, Geophysics, Correlation techniques

The total mass m of the earth's atmosphere has been computed as precisely as possible from the present data on the atmospheric pressue and height distribution of the earth's land. The result is m = (5.136 = 0.007) X 10 to the 21 power g. The total mass of each of the principal constituents of the atmosphere was also computed. (Author)

AD-629 556 Fld. 4/1
CFSTI Prices: HC $4.60 MF $0.50
RAND CORP SANTA MONICA CALIF
SCATTERING MATRICES AND RECIPROCITY RELATIONSHIPS FOR VARIOUS REPRESENTATIONS OF THE STATE OF POLARIZATION,
by Z. Sekera. Mar 66, 49p. Rept. no. RM-4924-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Solar radiation, Planetary atmospheres), (*Planetary atmospheres, Transport properties), Scattering, Field theory, Polarization, Mathematical models, Matrix algebra

This work is a continuation of a study designed to put the theory of scattering and transfer of solar radiation in planetary atmospheres on a rigorous mathematical basis. The work examines several schemes for the complete quantitative description of a stream of radiation with regard to their suitability to the treatment of this theory. Relations between these schemes are found and certain conclusions about their properties are reached. The analytical effort combines classical field-theoretical concepts and optical principles with modern ma-

trix mathematics to make full use of high-speed computers in numerical modeling experiments. (Author)

AD-629 696 Fld. 4/1, 3/2
CFSTI Prices: HC $6.00 MF $1.25
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
GEOPHYSICS AND SPACE DATA BULLETIN. VOLUME II; NUMBER 3.
Quarterly rept. no. 3 for 1965,
by Anne L. Carrigan, and Norman J. Oliver.
1965, 213p.
Unclassified report

See also AD-624 195.

Descriptors: (*Geophysics, Periodicals), (*Space environmental conditions, Periodicals), Magnetometers, Cosmic rays, Neutron counters, Monitors, Radar echo areas, High frequency, Electromagnetic waves, Propagation, Radio astronomy, Solar radiation, Atmospheric sounding

Contents: Total field intensity magnetometer; Cosmic ray neutron intensity monitor; Oblique backscatter radar; Oblique high-frequency propagation; Riometer; Solar optical patrol observations; Solar radio emission; Vertical incidence ionospheric soundings.

AD-629 721 Fld. 4/1, 18/4, 22/2
CFSTI Prices: HC $4.00 MF $1.00
AMERICAN SCIENCE AND ENGINEERING INC CAMBRIDGE MASS
MEASUREMENTS OF LOW ENERGY ELECTRON PRECIPITATIONS ASSOCIATED WITH AURORAL DISTURBANCES AND TRAPPED RADIATION BELTS.
Final rept. 1 Mar 63-31 Sep 65,
by W. P. Reidy, G. F. Sinnamon, and P. R. Ruby.
12 Nov 65, 148p. Rept. no. ASE-1125,
Contract AF 19 (628)-2814, Proj. AF-0000,DASA-5710 Task 000009,07.007
AFCRL 65-856
Unclassified report

Descriptors: (*Space environmental conditions, Electron density), (*Atmospheric sounding, Radiation measurement systems), (*Radiation measurement systems, Sounding rockets), (*Sounding rockets, Radiation measurement systems), Aurorae, Van Allen radiation belt, Electrostatics, Probes (Electromagnetic)

An electrostatic analyzer designed to detect the spectrum and angular distribution of electrons in the regions explored by a high elliptical orbiting satellite is described. Details of the instrument's operation and calibration are given, along with its integration into the satellite. Integration of an instrument payload into the Astrobee 200 rocket system is described. Aerobee flights of three electronic analyzers into an aurora are described, and the data from these flights analyzed. (Author)

AD-628 926 See Fld. 5/1

AD-628 942 See Fld. 20/1

AD-629 087 See Fld. 8/14

AD-629 132 See Fld. 12/1

AD-629 319 See Fld. 20/14

AD-629 331 See Fld. 20/14

AD-629 359 See Fld. 17/9

AD-629 583 See Fld. 17/7

AD-629 665 See Fld. 7/4

4/2. METEOROLOGY

AD-628 903 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
STRATOSPHERIC TEMPERATURE VARIATIONS, 25 TO 55 KILOMETERS, AT LATITUDE 15 DEGREES N.
Air force surveys in geophysics (revised ed.),
by A. E. Cole, A. J. Kantor, and P. Nee. 1 Jun 65, 14p. Rept. no. AFCRL-65-878 ,AFCRL-AFSG-171
Proj. AF-8624, Task 862401,
Unclassified report

Revision of manuscript submitted 26 Mar 65.

Availability: Published in Journal of Geophysical Research, v70 n20 p5001-7 Oct 15 1965. Copies to DDC users only.

Descriptors: (*Stratosphere, Temperature), (*Temperature, Stratosphere), Meteorological parameters, Diurnal variations, Altitude

The relatively abundant meteorological rocket observations for locations near 30 degrees N and the thermal wind relationship have been used to obtain estimates of the annual temperature distribution between 25 and 55 km at 15 degrees N. Extrapolated temperatures are in good agreement with observed values at radiosonde levels and compare favorably with the few available rocket grenade observations at altitudes above 35 km. The agreement indicates that the zonal wind field is under geostrophic control. Annual temperature regimes are presented for six levels between 25 and 55 km at 15 degrees N. They complement patterns observed at higher latitudes and provide a logical upward extension, both in phase angle and amplitude, of the annual and semiannual oscillation that have been observed in the lower stratosphere near 15 degrees N. The differences between the maximum and minimum extrapolated mean monthly temperatures for levels between 25 and 55 km are smaller at 15 degrees N than at 30 or 60 degrees N. (Author)

AD-628 967 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE MAXIMUM RANGE OF RADAR DETECTION OF SHOWERS.
Research translation,
by G. B. Brylev, and E. M. Salman. Dec 65, 12p.
Rept. no. T-R-533,
Contract AF 19 (628)-3880,
TT 66-60673
Unclassified report

O Predelnoi Dalnosti Radiolokatsionnykh Obnaruzhenii Livenvykh Osadkov, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n159 p35-9 1964.

Descriptors: (*Meteorological radar, Rainfall), (*Rainfall, Radar scanning), (*Radar scanning, Rainfall), Atmospheric precipitation, Radar equipment, Sensitivity, USSR

The question of the maximum range of detection of showers by radar is examined. It is found that it depends on the range to the radio horizon and the width of the directional pattern of the antenna. (Author)

AD-628 972 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
NON-STATIONARY TURBULENT REGIME IN THE SURFACE LAYER OF THE ATMOSPHERE.
Research translation,
by S. S. Zilitinkevich. Dec 65, 21p. Rept. no. T-R-487,
Contract AF 19 (628)-3880,
TT 66-60677
Unclassified report

Nestatsionarnyi Turbulentnyi Režhim v Prizemnom Sloe Atmosfery, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n127 p3-13 1962.

Descriptors: (*Atmospheric motion, Micrometeorology), (*Micrometeorology, Atmospheric motion), Atmospheric temperature, Wind, USSR, Weather forecasting, Differential equations

Regularities in the vertical distribution of wind and temperature are ascertained for non-stationary conditions in a region of small values of dimensionless height. The problem of the quasi-stationary transformation of the temperature field is studied as a function of changes in the shortwave insolation. The relationships obtained can be used in forecasting. (Author)

AD-628 973 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE STRUCTURE OF THE WIND-VELOCITY AND TEMPERATURE FIELDS IN THE ATMOSPHERIC SURFACE BOUNDARY LAYER.
Research translation,
by A. S. Monin. Dec 65, 27p. Rept. no. T-R-508,
Contract AF 19 (628)-3880,
TT 66-60678
Unclassified report

O Strukture Polei Skorosti Vetra i Temperatury v Prizemnom Sloe Vozdukha, trans. of Akademiya Nauk SSSR. Institut Fiziki Atmosfery. Trudy, n4 p5-20 1962.

Descriptors: (*Micrometeorology, Atmospheric motion), (*Atmospheric motion, Micrometeorology), Turbulence, Meteorological parameters, Boundary layer, Surface area, Earth (Planet), USSR

The term surface is used to designate the lowest layer of air, which is several tens of meters thick and in which the Coriolis force may be neglected.

AD-628 974 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE COORDINATE-DOPPLER METHOD OF WIND OBSERVATION.
Research translation,
by A. G. Gorelik, V. V. Kostarev, and A. A. Chernikov. Dec 65, 10p. Rept. no. T-R-512,
Contract AF 19 (628)-3880,
TT 66-60679
Unclassified report

Koordinatnodopplerovskii Metod Vetrovykh Navliudenii, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p19-23 1964.

Descriptors: (*Radiosondes, Doppler effect), (*Doppler effect, Radiosondes), (*Wind, Measurement), Atmospheric motion, Atmospheric sounding, USSR

The paper deals with a new rawin method which differs from those used earlier in that it permits measurement of both the mean wind speed and the turbulence parameters at various levels. The errors of the method are evaluated and a block diagram of the apparatus is described. (Author)

AD-629 007 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
DISTRIBUTION OF WATER CONTENT IN CU CONG MODIFIED TO PRODUCE PRECIPITATION.
Research translation,

by F. Ia. Dec 65, 15p. Rept. no. T-R-525, Contract AF 19 (628)-3880, T 66-60681

Unclassified report

Raspredelenie Vodnosti v Cu Cong., Podvergavshikhsia Vozdeistviyams Tseliu Vyzyvaniya Osadkov, trans. of Ukrainskii Nauchno-Issledovatelskii Gidro-Meteorologicheskii Institut. Trudy (USSR) n47 p59-64 1965.

Descriptors: (*Artificial precipitation, USSR), Clouds, Water, Abundance, Height finding, Meteorology, Atmospheric sounding

The present paper treats of the connection between the distribution of water content with height in Cu cong and the results of their modification. Cu cong 2200 to 3500 m thick were investigated. Analysis of the measurement data established that data on the distribution of water content in Cu cong can be used as a parameter for determining the expediency of modification to produce precipitation. (Author)

AD-629 008 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SPECIAL FEATURES OF THE RADAR CHARACTERISTICS OF THUNDERSTORM CLOUDS.
Research translation, by S. B. Gashina, and E. M. Salman. Dec 65, 7p. Rept. no. T-R-535, Contract AF 19 (628)-3880, TT 66-60682

Unclassified report

Osobennosti Radiolokatsionnykh Kharakteristik Grozovykh Oblakov, trans. of Glavanaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n173 p19-25 1965.

Descriptors: (*Cumulonimbus clouds, Radar echo areas), (*Thunderstorms, Radar echo areas), (*Meteorological radar, Thunderstorms), (*Radar echo areas, Thunderstorms), Weather forecasting, Meteorological phenomena, USSR

The article treats the problem of identification of regions with intense thunderstorm activity against the background of the general field of cumulonimbus clouds. The radar criteria of thunderstorm clouds are indicated with allowance for the dynamics of their development. (Author)

AD-629 009 Fld. 4/2
CFSTI Prices: HC $4.00 MF $0.75
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
NUMERICAL METHODS FOR SOLVING WEATHERFORECASTING AND CLIMATE-THEORY PROBLEMS, PART I.
Research translation, by G. I. Marchuk. Nov 65, 104p. Rept. no. T-R-520, Contract AF 19 (628)-3880, TT 66-60683

Unclassified report

Trans. of mono. Chislenne Metody Resheniya Zadach Prognoza Pogody i Teorii Klimata, Chast' I, Novosibirsk, 1965.

Descriptors: (*Weather forecasting, Numerical methods and procedures), (*Climatology, Numerical methods and procedures), Meteorological parameters, Data processing systems, Algorithms, USSR

AD-629 010 Fld. 4/2
FSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
PROPERTIES OF THE RADAR ECHO IN SOUNDING OF CU CLOUDS OF SMALL VERTICAL EXTENT.
Research translation, by E. M. Salman, and G. B. Brylev. Dec 65, 12p. Rept. no. T-R-527, Contract AF 19 (628)-3880, TT 66-60684

Unclassified report

Osobennosti Radioekho pri Zondirovanii Kuchevykh Oblakov Nebolshoi Vertikalnoi Protiazhennosti, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n159 p65-9 1964.

Descriptors: (*Radar echo areas, Cumulus clouds), (*Cumulus clouds, Radar echo areas), (*Atmospheric sounding, Radar echo areas), Meteorology, USSR

AD-629 118 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
METHODS FOR IDENTIFYING SEVERE THUNDERSTORMS BY RADAR: A GUIDE AND BIBLIOGRAPHY.
Environmental research papers, by Ralph J. Donaldson,Jr.. Oct 65, 29p. Rept. no. AFCRL-ERP-150,AFCRL-65-760 Proj. AF 6672, Task 667203,

Unclassified report

Availability: Published in Bulletin of the American Meteorological Society v46 n4 p174-93 Apr 1965. Copies to DDC users only.

Descriptors: (*Thunderstorms, Radar scanning), (*Meteorological radar, Thunderstorms), (*Weather forecasting, Thunderstorms), Storms, Radar echo areas, Spectrum signatures, Bibliographies

This is a review with an extensive bibliography of currently useful methods for identifying severe thunderstorms, hailstorms, and tornadoes by conventional radar techniques. (Author)

AD-629 163 Fld. 4/2
CFSTI Prices: HC $4.60 MF $0.50
NATIONAL ENGINEERING SCIENCE CO HOUSTON TEX
ATMOSPHERIC WATER BUDGET OVER TROPICAL AREAS.
Interim technical rept., by W. H. Portig. Jan 66, 49p. Contract DA-28-043-AMC-01549 (E), Proj. DA-1VO-14501-B-53A-09, ECOM 01549 (E)-1

Unclassified report

Descriptors: (*Water vapor, Marine meteorology), (*Marine meteorology, Tropical regions), (*Tropical regions, Marine meteorology), Evapotranspiration, Humidity, Atmosphere, Transport properties, Diurnal variations

Theoretical computations show that the salt transport thru the air is negligibly small in relation to the salt transport thru water and can be neglected in salinity balance computations. During the rainy season in the Caribbean, transport of liquid water thru the air cannot be neglected although in the dry season it can. In typical trade wind regimes, there is generally a small eddy vapor flux, since fluctuations in both moisture and wind are relatively small. Monthly maps of mean vapor flux in the Caribbean are presented. It is noted that strong changes in rainfall regimes are scarcely reflected in the flux patterns. Diurnal variation of the vapor flux is investigated and a strong diurnal variation is found. Since this variation occurs wide regions and is not localized, more intensive research will be required to determine the cause. (Author)

AD-629 524 Fld. 4/2
CFSTI Prices: HC $4.00 MF $0.75
RAVEN INDUSTRIES INC SIOUX FALLS S DAK METEOROLOGY DEPT
LIGHT WINDS IN THE STRATOSPHERE (15-24 KM). PART 3,
by E. M. Frisby, R. K. Engel, and L. V. Nelson. Sep 66, 120p. Rept. no. 0266, Contract Nonr-4347 (00),

Unclassified report

See also AD-619 536.

Descriptors: (*Wind, Stratosphere), (*Stratosphere, Wind), Atmospheric sounding, Meteorology, Climatology

This report does no theorizing. It emphasizes those stratospheric characteristics that can be of value operationally and aims at presenting a large volume of observational material in such form that it can be used directly from maps and diagrams, without further processing. Although the number of diagrams shown in the report as examples of each study is large, it represents by no means the total amount of data-processing that has been done under this latest phase of the contract. Results quoted are based on a review of all the data processed. The entire collection of working sheets is available at Raven Industries, Inc. on request. (Author)

AD-629 527 Fld. 4/2, 18/8
CFSTI Prices: HC $6.60 MF $0.75
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
DISTRIBUTION OF VOLCANIC FALLOUT IN AND ABOUT A ONE-STORY RESIDENCE,
by F. K. Kawahara, and Robert J. Crew. 11 Aug 65, 62p. Rept. no. USNRDL-TR-953, Task OCD-3118A,

Unclassified report

Descriptors: (*Air pollution, Volcanoes), (*Volcanoes, Air pollution), (*Radioactive fallout, Simulation), Buildings, Particles, Dust, Distribution, Atmosphere, Transport properties, Health physics, Civil defense systems

The sand-like debris from Volcano Irazu in Costa Rica closely resembles the type of fallout produced by a nearsurface or underground nuclear detonation. The activity of the volcano during April and May 1964 presented an opportunity to use this phenomenon in a field-scale study of some relationships between urban reclamation and nuclear fallout contamination. The investigation was divided into two phases: (I) distribution of debris inside a one-story residence; and (II) distribution outside the residence. In Phase I, it was observed that particle size distributions inside the house did not differ greatly from those deposited outside. Mass loadings inside were a factor of 50 less than those outside. It was concluded that, if this were a case of radioactive fallout, the ratio of outside dose to inside dose would be reduced significantly in the vicinity of the window through which air is moving. In Phase II, it was observed that in the absence of rain, the particle size distribution and mass deposited was uniform from one sample location to another, only minor variations having been observed from day to day. On this basis, it was concluded that reclamation tests using uniformly distributed synthetic fallout are realistic even when the surface configurations are quite complex. When rain accompanied the debris deposition, however, different results were observed. Particle size distributions and mass loadings were a function of redistribution and varied with sample location. Deposits on roof surfaces will be significantly reduced but will accumulate in the gutters. In the case of radioactive fallout, a concentrated radiation source would result. (Author)

AD-629 588 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
VERTICAL VELOCITY FLUCTUATIONS IN A NOCTURNAL LOW-LEVEL JET.
Environmental research papers (Revised ed.), by J. C. Kaimal, and V. Izumi. 5 Jul 65, 14p.

Rept. no. AFCRL-ERP-169,AFCRL-66-60
Proj. AF-7655, Task 765501,
Unclassified report

Revision of manuscript submitted 4 May 65.

Availability: Published in Journal of Applied Meteorology v4 n5 p576-84 Oct 1965. Copies to DDC users only.

Descriptors: (*Jets streams (Meteorology), Velocity), Anemometers, Jets, Analysis of variance, Turbulence

Sonic anemometers were installed at four levels on the Cedar Hill television tower and operated for selected periods during three weeks in August 1963. One of the runs covered the entire history of a nocturnal low-level jet. The vertical velocity fluctuations measured by the sonic anemometers are examined closely for their relationship to mean horizontal wind speed and temperature profiles obtained from existing meteorological instrumentation on the tower. In a qualitative sense the data confirm many of the current speculations on the role of turbulence in the development and dissipation of these jets. Statistical analysis of the fluctuation data provides some interesting results, particularly for the period following breakdown of the surface inversion. The constant of proportionality between standard deviation of the vertical velocity component at 150 ft and friction velocity is found to be 1.22. The limiting value of Richardson number for maintenance of an inversion at 450 ft appears to be 0.25. (Author)

AD-629 662 Fld. 4/2, 2/4
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
AGROCLIMATIC HANDBOOK FOR TYUMEN' OBLAST (SOUTHERN PART),
by L. P. Skvortsov. 11 Jan 65, 21p. Rept. no. I-6285,
TT 66-60741
Unclassified report

Trans. of mono. Agroklimaticheskii Spravochnik po Tyumenskoi Oblasti (Yuzhnaya Chast'), Leningrad, 1960 p37-52, 57-60, 149-50.

Descriptors: (*Climatology, USSR), (*Agriculture, Climatology), Soils, Weather forecasting, Handbooks

AD-628 916 See Fld. 8/10

AD-629 277 See Fld. 19/4

Field 5-BEHAVIORAL AND SOCIAL SCIENCES

5. BEHAVIORAL AND SOCIAL SCIENCES

AD-629 341 Fld. 5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
MYCOTIC KERATITIS,
by Ben S. Fine. 1965, 11p.
Unclassified report

Availability: Published in The Cornea, World Congress, p207-17 1965. Copies to DDC users only.

Descriptors: (*Cornea, Fungi), (*Fungi, Cornea), Eye, Diseases, Diagnosis, Therapy, Infections, Molds (Organisms), Yeasts, Spores, Antibiotics, Corticosteroid agents, Ulcers, Chemotherapy, Histology, Pathology

Treatment, consists above all of prophylaxis or early therapy. Awareness on the part of the practitioner of the possibility of a fungal infection complicating injuries, chronic corneal diseases, surgical procedures, or chronic debilitating diseases generally should, with vigorous early intervention, prevent blindness or loss of the eye. Curettage for purposes of both diagnosis and therapy should be done. Antimycotic agents may be vigorously used for from four to six days, but if the lesion is progressing and the clinician can be reasonably certain that a mold is involved (or a yeast infection no longer active) a keratoplasty -- preferably penetrating -- would then be in order before the lens-iris diaphragm is grossly involved in the inflammatory exudate of the anterior chamber. Corticosteroids may be of considerable value in controlling fungus-induced inflammation just prior to or during the course of a suitable form of treatment such as curettage or keratoplasty. It is only the injudicious long-term use of corticosteroids that is contraindicated. (Author)

5/1. ADMINISTRATION AND MANAGEMENT

AD-628 926 Fld. 5/1, 20/9, 9/4, 20/8, +
CFSTI Prices: HC $27.10 MF $1.50
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
QUARTERLY PROGRESS REPORT NO. 80. GENERAL PHYSICS, PLASMA DYNAMICS AND COMMUNICATION SCIENCES AND ENGINEERING,
by H. J. Zimmermann, and G. G. Harvey. 15 Jan 66, 275p. Contract DA-36-039-AMC-03200(E), AF19(628)-2487
Unclassified report

Descriptors: (*Scientific research, Reports), Physics, Plasma physics, Information theory, Electronics, Biophysics, Linguistics, Bionics, Data transmission systems, Spectroscopy, Geophysics, Molecular beams, Ultrasonic radiation, Computers, Numerical analysis

AD-628 946 Fld. 5/1, 20/9, 20/12, 22/1, +
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
FOREIGN SCIENCE BULLETIN VOL. 2, NO. 2.
Feb 66, 60p.
TT 66-60672
Unclassified report

A Monthly Review of Selected Foreign Scientific and Technical Literature Sponsored by the Department of Defense.

Descriptors: (*Scientific research, USSR), (*Reviews, Scientific research), (*Plasma medium, Microwaves), (*Polymers, Semiconductors), Acrylonitrile polymers, Heat treatment, Synthesis (Chemistry), Electrical properties, Nervous systems, Astronauts, Space flight, Lasers, Light communication systems, Very high frequency, Wave transmission, Mountains, Temperature measurement, Gas flow, Test methods, Crystal growth, Iron compounds, Yttrium compounds, Garnet, Rare earth compounds, Crystal structure, Gadolinium alloys, Germanium alloys, Low-temperature research

Contents: Reviews; Plasma Diagnostics by Microwaves, Soviet Research in Semiconducting Polymers. I. HeatTreated Polyacrylonitrile, Science and technology notes; Vestibular Problems on the Voskhod-1 Flight, Synthesis of a Receiver of Light Signals With Heterodyning of Light, Propagation characteristics of Vhf Signals Transmitted Over Mountain Terrain, Method of Measuring Rapidly Changing Temperatures of Gas Streams, Hydrothermal Growth of Yttrium-and Rare Earth Element-Iron Garnet Crystals, Crystal Structure of Gadolinium Germanides. Conferences; Soviet Physicists in Puerto Rico, Eleventh All-Union Conference on Low-Temperature Physics.

AD-629 229 Fld. 5/1, 13/8, 12/2
CFSTI Prices: HC $2.00 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
AN EMPIRICAL STUDY OF SCHEDULING DECISION BEHAVIOR.
Management sciences research rept.,
by C. H. Kriebel, and P. D. Fox. Dec 65, 29p. Rept. no. MSRR-61,
Contract Nonr-760 (24), Proj. NR-047-048,
Unclassified report

Descriptors: (*Decision making, Production control), (*Production control, Decision making), Scheduling, Management planning, Model theory, Management control systems

This paper reports on an empirical study of schedule sequencing and develops a model which describes certain aspects of the decision-making behavior of a manager in a New England manufacturing firm. The production scheduling decision for which the manager is responsible is critical to the company's profitable operation, recurs daily, and can be programmed in the form of a decision rule. The model estimated provides a mechanism for predicting the manager's behavior with reasonable accuracy. Scheduling decision performance is discussed in terms of optimal and consistent behavior under the rule. (Author)

AD-629 230 Fld. 5/1, 12/2
CFSTI Prices: HC $1.60 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
TIME-DEPENDENT DELAYS AT TRAFFIC MERGES.
Management sciences research rept.,
by D. P. Gaver,Jr.. Jan 66, 19p. Rept. no. MSRR-64,
Contract Nonr-760 (24), Proj. NR-047-048,
Unclassified report

Prepared in cooperation with Westinghouse Research Labs., Pittsburgh, Pa. Presented at the International Symposium on the Theory of Traffic Flow (3rd), New York, 1965.

Descriptors: (*Traffic, Queueing theory), (*Queueing theory, Traffic), Mathematical models, Management planning, Probability, Time studies

The expected delay of a side-road driver attempting to merge with, or cross, a main-road traffic stream is studied. The model includes the effect of mixture of 'slow' and 'fast' drivers at the side road, and of different gap acceptance probabilities. Numerical results show the manner in which long-run delays are approached, and an approximation to the transient behavior of delays is studied. (Author)

AD-629 268 Fld. 5/1
CFSTI Prices: HC $1.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
THE MANAGEMENT OF PROGRAMMED RESEARCH,
by Milton G. Holmen. 9 Feb 66, 13p. Rept. no. SP-2355,
Unclassified report

Descriptors: (*Research program administration, Management engineering), (*Management engineering, Scientific research), Theory, Management planning

Programmed research is research of such magnitude or performed under such contract arrangements that the research staff is obligated to review its plans with another agency, either a separate one, or an agengy of which the research staff is a part. The steps involved in developing a management system for programmed research include the following: (a) establishing explicit goals for the research activity; (b) establishing policies for achieving the goals; (c) providing an organizational structure and staff to conduct the research; (d) scheduling the work and budgeting needed resources, and

(e) developing a review procedure by which corporate management can evaluate the effectiveness of the organization in achieving project goals, and the appropriateness of the goals and policies over times.

AD-629 564 Fld. 5/1
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
SYSTEMS ANALYSIS TECHNIQUES FOR PLANNINGPROGRAMMING-BUDGETING,
by E. S. Quade. Mar 66, 32p. Rept. no. P-3322,
Unclassified report

Presented in the course Executive Orientation in Planning, Programming, and Budgeting, Washington, D. C. February 24-5 1966.

Descriptors: (*Management planning, Systems engineering), (*Budgets, Systems engineering), Decision making, Effectiveness, Weapon systems, Costs

A systems analysis is an analytic study designed to help a decisionmaker identify a preferred choice among possible alternatives. It is characterized by a systematic and rational approach, with assumptions made explicit, objectives and criteria clearly defined, and alternative courses of action compared in the light of their possible consequences. An effort is made to use quantitative methods, but computers are not essential. What is essential is a model that enables expert intuition and judgment to be applied efficiently. The method provides its answer by processes that are accessible to critical examination, capable of duplication by others, and, more or less, readily modified as new information becomes available. And, in contrast to other aids to decisionmaking, which share the same limitations, it extracts everything possible from scientific methods, and therefore its virtues are the virtues of those methods. (Author)

AD-629 587 Fld. 5/1
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
BOOK REVIEW: SOVIET RESEARCH AND DEVELOPMENT: ITS ORGANIZATION, PERSONNEL, AND FUNDS,
by F. J. Krieger. Mar 66, 5p. Rept. no. P-3324,
Unclassified report

Descriptors: (*Scientific research, USSR), Research program administration, Scientific personnel, Professional personnel, Communism, Universities, Scientific organizations, Distribution, Costs, Statistical analysis, Reviews

AD-629 700 Fld. 5/1
CFSTI Prices: HC $1.00 MF $0.50
RESEARCH ANALYSIS CORP MCLEAN VA
COST-OF-RESEARCH INDEX,
by Helen S. Milton. Mar 66, 25p. Rept. no. rac-TP-209,
Contract DA-44-188-ARO-1,
Unclassified report

Descriptors: (*Scientific research, Costs), Measurement, Scientific personnel, Budgets, Technicians, Wages, Industries, Universities, Research program administration

The cost-of-research index provides a measure of the cost of technical man-years supported by research and development (R and D) funds expended yearly in the US relative to effort--in contrast to dollars--that has been put forth in US R and D. Although the annual US R and D dollar totals have increased from less than $3 billion in 1950 to about $22 billion in 1965, the actual man-years of technical effort indicated by the application of the cost-of-research index to the annual dollar totals increased at approximately one-half the rate of increase of funds expended. During the past 5 years there has been an appreciable decline from the mid-1950's in the rate of increase in the technical-man-year costs. Research and development is accomplished by the expenditure of manpower and dollars, and all approaches to planning and budgeting for R and D must be based on consideration of both. The cost-of-research index designed to determine the rates of change in costs per technical man-year should be updated and applied in such planning and budgeting on a recurring annual basis. (Author)

AD-629 131 See Fld. 15/5

AD-629 308 See Fld. 12/2

AD-629 375 See Fld. 12/1

5/2. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-628 895 Fld. 5/2
CFSTI Prices:MF $0.50
OFFICE OF NAVAL RESEARCH WASHINGTON D C
DIRECTORY OF DEPARTMENT OF DEFENSE INFORMATION ANALYSIS CENTERS.
1966, 30p. Rept. no. ONR-23,
Unclassified report

Availability: Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.15 as D-210.2:In3/2.

Descriptors: (*Technical information centers, Directories), Department of Defense, Reports

AD-629 225 Fld. 5/2, 17/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
FRANKFORD ARSENAL PHILADELPHIA PA FIRE CONTROL ENGINEERING DIRECTORATE
IDEEA NETWORK IMPLEMENTATION, FISCAL YEAR 1965.
Memorandum rept.,
by S. E. Torrey. Jan 66, 28p. Proj. DA-2P023201A720,
FA M66-16-1
Unclassified report

Descriptors: (*Information retrieval, Chemistry), (*Chemistry, Information retrieval), (*Data transmission systems, Information retrieval), Army research, Technical information centers, Networks, Instrumentation, Systems engineering

The IDEEA Network is a five-station experimental system for the storage, retrieval, and dissemination of chemical structures and data. The Network is being implemented with available hardware and will be used to collect data on the rates and modes of use. The Network concept and the hardware to be used in the Network are described. The effort that was applied to the Network implementation during Fiscal Year 1965 is also described. (Author)

AD-629 367 Fld. 5/2, 9/4
HERNER AND CO WASHINGTON D C
'USE' AND MENTION IN THE INFORMATION SCIENCES,
by Robert A. Fairthorne. 1965, 6p. Contract AF 49 (638)-1427, Proj. AF-9769 Task 976902, AFOSR 65-2289
Unclassified report

Availability: Published in Education for Information Science p9-12 1965. Copies to DDC users only.

Descriptors: (*Documentation, Language), (*Information theory, Language), Libraries

The Information Sciences study certain aspects of the use of language for certain ends. They do not themselves use language for these ends; they only mention such use. Many current confusions and absurdities concerning the proper, and possible, scope and aims of 'informational' devices, processes, and studies could be resolved by distinguishing between tools, their users, and their uses. Slovenly use of the word 'information' to denote, without definition, anything from pieces of paper to increase of knowledge gravely aggravates these confusions. The word is not only confusing, but unnecessary, for before people can be informed about anything they must be told or notified about it. Thus the first task of information systems is 'Notification,' an activity that includes both 'dissemination' and 'information retrieval.' (Author)

AD-629 606 Fld. 5/2, 9/2
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
THE CATALOG INPUT/OUTPUT SYSTEM,
by Martin Kay, Frederick Valadez, and TheodoreZiehe. Mar 66, 71p. Rept. no. RM-4540-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Information retrieval, Data storage systems), (*Catalogs, Information retrieval), (*Programming (Computers), Information retrieval), Programming languages, Linguistics, Input-output devices, Magnetic tape

A complete definition of the format used for catalogs on magnetic tape and a description of the routines of the Catalog Input-Output System. Catalog maps, catalog data, and tape labels are written as logical records in a specially designed blocking format. Beginnings and ends of blocks, physical tapes, and catalogs are explicitly marked. The Catalog Input/Output System offers a variety of input/out unit-control operations in addition to the commands for reading and writting data in catalog format. The reading and writing commands are implemented on three levels: Level III handles individual data; Level II reads and writes logical records; and Level I processes blocks of information. (Author)

AD-629 313 See Fld. 6/5

AD-629 368 See Fld. 6/4

5/3. ECONOMICS

AD-629 133 Fld. 5/3, 5/4
CFSTI Prices: HC $4.00 MF $0.75
RAND CORP SANTA MONICA CALIF
THE COMMON MARKET AND EUROPEAN UNIFICATION,
by R. T. Nichols. Dec 65, 125p. Rept. no. rm-4640-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Europe, Economics), (*Economics, Europe), (*Commerce, Europe), Political science

A study of the Common Market; its past problems, current difficulties, and future possibilities are presented. The study consists of seven sections, each of which may be read independently: (1) an introduction to the Common Market; (2) the Common Market and internal trade; (3) external economic policies of the European Economic Community; (4) the European Free Trade Association; (5) prospective members of the European Economic Community; (6) European Economic Community agriculture; and (7) the Common Market and European political unification. Statistical tables showing import and export data of the Common Market countries are appended. (Author)

AD-629 223 Fld. 5/3
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
INDIAN INDUSTRY: SOME PROPOSED AREAS OF RESEARCH,

by George Rosen. Mar 66, 6p. Rept. no. P-3317,

Unclassified report

Descriptors: (*India, Industrial research), (*Industries, India), Economics, Rural areas, Urban areas, Agriculture, Labor

The most important problem in the industrialization of India is claimed to be the interaction of its industrial and agricultural sectors. Apparently, even though India has carried out massive industrial investments, there has been only a minor shift, if any, in terms of total employment from agriculture to industry. Also, while a greatly increased volume of resources has moved into both sectors, there is still apparently a large net outflow of resources from the urban sector (largely industry) to the rural sector (largely agriculture). Questions arising include: What has happened since 1950 with respect to rural demand for industrial products. With higher farm output and rural incomes, have the peasants widened their demands for industrial products beyond the traditional few. Can the government encourage the output of industrial goods for which there appears to be a rising rural demand as opposed to other industrial goods to expand still further the rural consumption of such goods. (Prepared for presentation at the Indian Industrial Development Conference)

AD-629 447 **See Fld. 10/2**

AD-629 521 **See Fld. 12/2**

5/4. HISTORY, LAW AND POLITICAL SCIENCE

AD-629 555 Fld. 5/4
CFSTI Prices: HC $3.60 MF $0.50
RAND CORP SANTA MONICA CALIF
WEIGHTED VOTING: A MATHEMATICAL ANALYSIS FOR INSTRUMENTAL JUDGMENTS,
by Lloyd S. Shapley, and William H. Riker. Mar 66, 34p. Rept. no. P-3318,

Unclassified report

Presented at the Christmas 1965 meeting of the American Society for Political and Legal Philosophy, New York City.

Descriptors: (*Law, United States), (*Political science, United States), United States Government, Mathematical analysis, Population, Distribution

A paradox is suggested: that those whom its advocates say are its beneficiaries are probably those who are hurt by weighted voting, while those whom its opponents say are its victims probably gain from it. Typically the reason (whether publicly stated or not) for advocating weighted voting has been that the advocate wishes to save the seats of representatives from small districts which are likely to be consolidated under reapportionment into districts of equal size. It has almost invariably been the citizens of large districts who have brought suits against the adoption of weighted voting in legislatures, presumably because they feared that their influence would be less under a system of weighted voting than under a system of districts of equal size. If the analysis given is correct, both advocates and opponents have been wrong and each have taken positions contrary to their own best interests. The explanation of the paradox is that both parties to the dispute have apparently assumed that the citizens and legislators from the smaller districts would have more power than citizens and legislators from larger districts simply because the former have more legislators than the latter.

AD-629 569 Fld. 5/4
CFSTI Prices: HC $2.00 MF $0.50
LEIDEN RIJKSUNIVERSITEIT (NETHERLANDS)
GERMANY IN AMERICAN FOREIGN POLICY,
by Hans Speier. Mar 66, 46p. Rept. no. p-3321,

Unclassified report

Presented at the International Wehrkunde Conference in Munich on January 29, 1966.

Descriptors: (*United States Government, Foreign policy), (*West Germany, Foreign policy), History, Wstern Europe, Government (Foreign), USSR, France

AD-629 133 **See Fld. 5/3**

AD-629 234 **See Fld. 5/11**

5/5. HUMAN FACTORS ENGINEERING

AD-628 940 **See Fld. 5/9**

AD-628 964 **See Fld. 6/5**

AD-629 145 **See Fld. 15/5**

AD-629 453 **See Fld. 1/2**

5/6. HUMANITIES

AD-629 469 Fld. 5/6
CFSTI Prices: HC $5.00 MF $1.00
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PROBLEMS OF MARXIST-LENINIST ESTHETICS AND ESTHETIC EDUCATION,
by N. V. Manova. 8 Dec 65, 158p. Rept. no. FTD-TT-65-964,
TT 66-60730

Unclassified report

Edited trans. of mono. Vprosi na Marksistko-Leninskata Estetika i Esteticheskoto Vzpitanie, Sofiya, 1963 134p.

Descriptors: (*Culture, USSR), Education, History, Creativity, Theory, Communism, Bibliographies

The bibliography lists literary works on problems of esthetics and esthetic education in Bulgaria and Russia. Publications up to the 30th June, 1962, are incorporated. The book is destined for cultural and scientific officials and library experts for their reference and cultural work.

5/7. LINGUISTICS

AD-629 254 Fld. 5/7
CAMBRIDGE LANGUAGE RESEARCH UNIT (ENGLAND)
COMMENTARY ON THE GUBERINA HYPOTHESIS,
by Margaret Masterman. 1963, 33p. Contract AF 61 (052)-647, Proj. AF-9769, Task 976905, AFOSR 65-2247

Unclassified report

Availability: Published in Estratto Rivista Methodos v15 n57-58 p139-68 1963. Copies to DDC users only.

Descriptors: (*Linguistics, Theory), (*Language, Theory), Machine translation, Semantics, Syntax, Grammars

Comments are made on the hypothesis of Peter Guberina that there exists a single formula of semantic progression at the basis of all human communication. The hypothesis is expounded in the paper 'La logique de la logique et la logique du langage' (Zagreb, post 1954) and the book 'Valeur logique et valeur stylistique des propositions complexes' (Paris, 1939, and Zagreb, 1954). The hypothesis is regarded as a new generative idea in the basic research into mechanical translation. Guberina sees language as a multiple contrast system made up of 2 units and 3 relations, with single systems of semantic classifiers and one formula (the 'semantic square'), of which all other semantic or syntactic forms actually found in language must be construed either as variants or as abbreviations. The 2 units are a generalized subject of discourse, or subject, and the most generalized possible version of what is said about it, or predicate. The relations are inclusion, solidarity or semantic overlap or cognateness, and descriptive implication.

AD-629 309 Fld. 5/7, 12/1
CFSTI Prices: HC $2.00 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
MAPPINGS WHICH PRESERVE CONTEXT SENSITIVE LANGUAGES.
Technical memo.,
by Seymour Ginsburg, and Sheila A. Greibach.
27 Oct 65, 32p. Rept. no. Scientific-3,TM-738/018/00
Contract AF 19 (628)-5166, Proj. AF-5632, Task 563205,
AFCRL 66-62

Unclassified report

Prepared in cooperation with Harvard Univ., Cambridge, Mass.

Descriptors: (*Mapping (Transformations), Context sensitive grammars), (*Context sensitive grammars, Mapping (Transformations), Transducers, Context free grammars

A basic result which gives a condition under which a (possibly length-decreasing) homomorphism preserves a context sensitive language is presented. Using this result, conditions under which pushdown transducers and linear bounded transducers preserve context sensitive languages are given. The basic result is also applied to show that certain rewriting systems generate context sensitive languages instead of arbitrary recursively enumerable sets. Of special interest is the result that if each rule in a rewriting system has a terminal letter of its right side, then the language generated is context free. (Author)

AD-629 444 Fld. 5/7, 15/4
CFSTI Prices: HC $2.00 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
DEVELOPMENT AND EVALUATION OF A TACTICAL MANDARIN CHINESE LANGUAGE COURSE.
Technical rept.,
by Catherine Garvey, and Eugene H. Rocklyn.
Dec 65, 49p. Rept. no. TR-65-15,
Contract DA-44-188-ARO-2, Proj. DA-2J024701A712-01,

Unclassified report

Descriptors: (*Chinese language, Programmed instruction), Training, Tactical warfare, Military intelligence, Enemy personnel, Prisoners, Military training, Learning, Achievement tests, Programming languages

To meet the need for a short, self-instructional tactical language course in a Far Eastern tonal type language of potential military significance, a course in Mandarin Chinese was developed, by adapting the methods described in Subtask CONTACT II with reference to a European type language (Russian). The purpose of the course was to enable combat soldiers to acquire perishable tactical information from newly captured POWs. The course was programed in the format of the Russian model with a major change in the addition of tone-discrimination and tone-production lessons. Six male students, high school seniors and graduates with varied language-learning aptitudes, took the course and completed it in 61 to 84 hours. Their final test scores, indicating ability to speak and understand all the assigned Chinese vocabulary, ranged from 55% to 98% correct. In a simulated questioning test, the mean percentage of correctly translated answers was 86%. Although low language-learning aptitude was associated with lower

scores, the overall achievement appeared to be satisfactory. (Author)

AD-629 455 Fld. 5/7, 9/2
MITRE CORP BEDFORD MASS
THE MITRE SYNTACTIC ANALYSIS PROCEDURE FOR TRANSFORMATIONAL GRAMMARS,
by Arnold M. Zwicky, Joyce Friedman, Barbara C. Hall, and Donald E. Walker. Feb 66, 17p. Rept. no. mtp-9,
Contract AF 19 (628)-2390, Proj. AF-7020, ESD TR-65-127

Unclassified report

Availability: Published in Proceedings of Fall Joint Computer Conference p317-26 Nov-Dec 1965. Copies to DDC users only.

Descriptors: (*Transformational grammars, Syntax), (*Syntax, Transformational grammars), (*English language, Computers), Control, Programming languages, Data processing systems, Linguistics, Analysis

The syntactic analysis problem is defined and discussed with reference to the class of transformational grammars. A format for writing transformational grammars is presented; a grammar for a substantial part of English has been written in this format. A five-step syntactic analysis procedure for grammars in this form is described and compared with other approaches to the problem. The organization of associated computer programs is described, and the results of some experiments on the 7030 computer are given. (Author)

AD-629 692 Fld. 5/7, 5/9, 9/2
CFSTI Prices: HC $3.00 MF $0.75
ITEK CORP WALTHAM MASS
RUSSIAN STENOTYPE EQUIPMENT. VOLUME I. RUSSIAN STENOTYPE SYSTEMS CODES, COMPUTER SYSTEMS, AND TRAINING.
Final rept., vol. 1, Oct 63-Sep 65,
by Richard Marcus, Richard Libby, and Phillip Novier. Jan 66, 79p. Contract AF 30 (602)-3213, Proj. AF-5591,
RADC TR-65-329-Vol-1

Unclassified report

See also AD-608 663.

Descriptors: (*Russian language, Machine translation), (*Machine translation, Office equipment + supplies), (*Data processing systems, Russian language), Programming (Computers), Input-output devices, Coding, Typewriters, Teaching machines, Display systems, Training, Dictionaries

A program to develop a Russian Stenotype system was undertaken to provide a rapid and efficient method for converting Russian text into machine processable form. The Russian Stenotype system is a manual coding system designed to reduce the coding time and cost of the input function of Machine Aided Translation. This system will eventually replace the flexowriters, which are currently used, and with the installation of an operational Russian Print Reader, will serve as back-up. The report covers the software aspects of the work. In particular, the design of the Russian stenotype keyboard and coding system, computer transcription systems, dictionary compilation, training proceedures and study of information loss are discussed.

AD-629 693 Fld. 5/7, 14/3
CFSTI Prices: HC $2.00 MF $0.50
ITEK CORP WALTHAM MASS
RUSSIAN STENOTYPE EQUIPMENT. VOLUME II. RUSSIAN STENOTYPE TERMINAL EQUIPMENT AND INPUT MULTIPLEXING.
Final rept., vol. 2,
by Richard Marcus, Richard Libby, and Phillip Novier. Jan 66, 45p. Contract AF 30 (602)-3213,
RADC TR-65-329-Vol-2

Unclassified report

See also AD-629 692.

Descriptors: (*Data processing systems, Russian language), (*Machine translation, Office equipment + supplies), (*Russian language, Machine translation), Input-output devices, Digital systems, Coding, Telephone transmitters, Punched tape, English language, Teaching machines, Display systems, Recording systems, Mathematical models, Typewriters, Design, Costs

The volume covers the underlying concepts and description of remote-input terminal equipment developed for converting Stenotype keyboard actuations into electrical signals suitable for transmission to a different location for subsequent translation type processing. In addition the problem of multiplexing several such input terminals into the input of a single translating system is treated. The general problem addressed is posed by the possible use of Russian Stenotype keyboards as efficient and higher speed converters of Cyrillic text into machine readable form. This would be useful in a mechanical translation system such as the U. S. Air Force's AN/GSQ-16 (XW-2) as well as in other text conversion operations. The general system configurations studied and the specific equipment descriptions are based upon the existence of an electrically wired Stenograph keyboard with an optimized Russian keyboard arrangement, and a remote terminal 'serializer-encoder' which is capable of one-half duplex telephone line transmission as well as controlling operation of a paper tape punch or some other recording device. (Author)

AD-629 694 Fld. 5/7, 5/9
CFSTI Prices: HC $2.00 MF $0.50
ITEK CORP WALTHAM MASS
RUSSIAN STENOTYPE EQUIPMENT. VOLUME III. RUSSIAN STENOTYPE TRAINING AND EVALUATION MACHINE.
Final rept., vol. 3,
by Richard Marcus, Richard Libby, and Phillip Novier. Jan 66, 33p. Contract AF 30 (602)-3213,
RADC TR-65-329-Vol-3

Unclassified report

See also AD-629 693.

Descriptors: (*Russian language, Machine translation), (*Machine translation, Office equipment + supplies), (*Teaching machines, Office equipment + supplies), Teaching methods, Training, Typewriters, Training devices, Programmed instruction, Display systems, Costs, Learning

The volume discusses equipment development concerned with automating certain aspects of the teaching of Stenotype as a method for converting both textual and verbal Russian language source materials into machine readable form. While Volume I covered the 'software' and linguistic aspects of this problem, this report describes an experimental automated teaching and evaluation equipment, the methods and procedures for its use, and the rationale of its developed characteristics. Detailed technical description is included elsewhere in a technical manual. The equipment system described is an attempted compromise between equipment cost, lesson preparation flexibility, and teaching and evaluation effectiveness. It is concluded that a versatile tool has been produced for evaluating stenotype coding procedures as well as for studying training and evaluation parameters for exploiting the great potential of stenotypy as a high speed, versatile input keying method. (Author)

AD-629 695 Fld. 5/7, 5/9
CFSTI Prices: HC $3.00 MF $0.75
ITEK CORP WALTHAM MASS
RUSSIAN STENOTYPE EQUIPMENT. VOLUME IV. INSTRUCTOR'S TRAINING MANUAL FOR RUSSIAN STENOTYPE.
Final rept., vol. 4,
by Richard Marcus, Richard Libby, and Phillip Novier. Jan 66, 96p. Contract AF 30 (602)-3213,
RADC TR-65-329-Vol-4

Unclassified report

See also AD-629 694.

Descriptors: (*Russian language, Machine translation), (*Machine translation, Office equipment + supplies), (*Teaching methods, Office equipment + supplies), Instruction manuals, Training, Teaching machines, Learning, Typewriters, Effectiveness

Russian Stenotype systems provide a rapid and efficient method for converting textual or oral Russian language source matrials into machine readable form. One important aspect of this method is the training of stenotypists. A Teaching Machine was designed and built to aid in this training. This report describes the training procedures that would be employed with the Teaching Machine. While the Teaching Machine itself has not yet been tested, the training procedures described in this report have been hand-simulated in the successful training of students who have had no previous knowledge of Russian. Further work is recommended to determine the actual effectiveness of these procedures in the Teaching Machine environment. (Author)

5/9. PERSONNEL SELECTION, TRAINING AND EVALUATION

AD-628 940 Fld. 5/9, 5/5
CFSTI Prices: HC $3.00 MF $0.75
STANFORD UNIV CALIF DEPT OF CIVIL ENGINEERING
HUMAN FACTORS AS THEY AFFECT METHODS IMPROVEMENT IN CONSTRUCTION.
Technical rept.,
by W. Lloyd Jones. Sep 64, 65p. Rept. no. TR-45,
Contract NBy-45818,

Unclassified report

Descriptors: (*Personnel management, Construction), (*Construction, Personnel management), Human engineering, Industrial psychology, Civil engineering

The report discusses the problems of implementing methods improvement studies, i.e. introducing new methods, into an industry that has been characterized for years by individual independence. A comprehensive historical discussion of the development of 'scientific management' (an engineering approach to work methods) in the manufacturing industry shows the failures and successes that have characterized the first half of the twentieth century. The recent findings of the behavioral scientists (principally from industrial psychology) are reported and discussed as to their application to personnel management for construction. The author contends that a better understanding of the psychological needs of employees can markedly improve the success of methods improvement applications. The report and its extensive bibliography are designed to give managers an insight into the recent, pertinent behavioral science findings. (Author)

AD-628 944 Fld. 5/9, 5/10
CFSTI Prices: HC $1.60 MF $0.50
CINCINNATI UNIV OHIO
A COMPARISON OF FORWARD AND BACKWARD CHAINING TECHNIQUES FOR THE TEACHING OF VERBAL SEQUENTIAL TASKS.
Final technical rept. Jan-Jul 65,
by Kirk A. Johnson, and R. J. Senter. Dec 65, 20p. Contract AF 33 (615)-1046, Proj. AF-1710 Task 171007,
AMRL TR-65-203

Unclassified report

Descriptors: (*Learning, Psychometrics), Correlation techniques, Analysis of variance, Education, Verbal behavior

Three experiments were conducted to determine the relative merits of forward and backward chaining in the learning of sequential (serial) tasks. Previous research with animals has indicated the superiority of backward chaining and this principle frequently has been proposed for human learning. In all experiments the materials consisted of lists formed from familiar items (numbers, letters, words) arranged in arbitrary sequences. In the forward-chaining technique the subject begins by practicing the first item in the sequence. Next he practices the first and second and third items, and so on until he is practicing the entire sequence. In the backward-chaining technique the subject begins by practicing the last item in the sequence. He then practices the next-to-the-last and last items, then the third-from-last, next-to-last, and last items, and so on until he is practicing the entire sequence. In all three experiments, the forward-chaining technique was superior to the backward-chaining technique. In the first experiment, this difference was not reliable, but in each of the remaining experiments, it was. (Author)

AD-628 952 Fld. 5/9
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
IDENTIFICATION OF JOB REQUIREMENT FACTORS BY USE OF SIMULATED JOBS,
by Joseph M. Madden, and M. Joyce Giorgia.
1965, 17p. Proj. AF-7734 Task 773402,
Unclassified report

Availability: Published in Personnel Psychology, A Journal of Applied Research, v18 n3 p321-31 1965. Copies to DDC users only.

Descriptors: (*Air force personnel, Job analysis), (*Job analysis, Air force personnel), (*Officer personnel, Job analysis), Simulation, Factor analysis, Identification, Verbal behavior, Wages

Air Force officer jobs are evaluated by rating a verbal job description on ten requirement factors. If these factors cover all the requirements, judging merited pay or grade for the job incumbent could be based on a simulated job description presenting only the numerical ratings on the ten factors. To test this assumption, two groups of USAF majors ranked thirty real job descriptions and two groups ranked simulated descriptions in order of merited pay. Application of a multiple regression technique to the factor values showed that error in predicting the rank-order criterion was significantly greater for rankings from simulated descriptions than from the verbal descriptions. Examination of mean - rank discrepancies showed that, in this particular sampling of jobs, the ranking of simulated jobs was higher for jobs closely concerned with the primary defense mission and lower for jobs requiring a high level of scientific, professional, or technical competence. Adding ratings on these two factors to the simulated descriptions might result in judgments closer to those obtained from verbal descriptions. (Author)

AD-628 953 Fld. 5/9, 9/2
CFSTI Prices: HC $2.00 MF $0.50
ENTELEK INC NEWBURYPORT MASS
COMPUTER-ASSISTED INSTRUCTION: A SURVEY OF THE LITERATURE.
Semiannual rept. for 1 Jul-31 Dec 65,
by Albert E. Hickey, and John M. Newton. Jan 66, 37p. Rept. no. 66-101,
Contract Nonr-4757 (00), Proj. NR-154-254,
Unclassified report

Descriptors: (*Programmed instruction, Reviews), Programming (Computers), Computers, Education, Programming languages, Learning, Man-machine systems, Systems engineering

A selective review was made of 100 documents related to computer-assisted instruction (CAI). Headings: Applications, Systems, Languages, Instructional theory, Programming, Evaluation and Administration. Appendices list programs by subject matter, institutions with CAI, and central computers in CAI systems. (Author)

AD-628 960 Fld. 5/9
CFSTI Prices: HC $2.60 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
HUMRRO PRESENTATIONS TO MEETING OF NIKE ZEUS TRAINING PANEL (3RD).
Research bull.
4 Nov 59, 29p. Rept. no. HumRRO-RB-6,
Unclassified report

Descriptors: (*Training, Management engineering), (*Guided missile personnel, Training), Maintenance personnel, Job analysis

A summary is given of instructional philosophy and of the content and methods of instruction for the operation and maintenance of a missile system.

AD-628 962 Fld. 5/9
CFSTI Prices: HC $3.00 MF $0.75
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
LEADERSHIP CLIMATE FOR TRAINEE LEADERS: THE ARMY AIT PLATOON.
Research memo.,
by Paul D. Hood. Aug 63, 96p. Contract DA-44-188-ARO-2,
Unclassified report

Descriptors: (*Army training, Leadership), (*Leadership, Army training), Psychometrics, Attitudes, Social psychology, Factor analysis

AD-629 164 Fld. 5/9, 6/5
CFSTI Prices: HC $8.60 MF $0.75
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ORGANIZATION OF LABOR OF MEDICAL PERSONNEL,
by B. M. Matsko. 5 Nov 65, 88p. Rept. no. FTD-TT-65-970,
TT 66-60694
Unclassified report

Unedited rough draft trans. of mono. Organizatsiya Truda Meditsinskogo Personala, Moscow, 1962 88p.

Descriptors: (*Medical personnel, USSR), Personnel management, Hospitals, Job analysis, Nurses

Contents: Systems of work of doctors of amalgamated urban hospital; Schedule of work of doctors in hospitals, polyclinics and home visits; Distribution of working time of doctors in polyclinics, in hospitals and for house calls; Two-stage system of service of patients; On standardization of work of doctors of main specialities in urban, regional and clinical hospitals.

AD-629 304 Fld. 5/9
CFSTI Prices: HC $2.60 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
PERFORMANCE AIDS FOR JUNIOR OFFICERS.
Technical rept.,
by Harry L. Ammerman. Dec 65, 30p. Rept. no. TR-65-11,
Contract DA-44-188-ARO-2, Proj. DA-2J024701A712-01,
Unclassified report

Descriptors: (*Officer personnel, Military training), (*Military training, Training devices), Teaching methods, Learning, Instruction manuals, Job analysis

The study summarizes the comments and suggestions of a large number of air defense battery officers concerning the types of managerial aids which would be useful to performance and learning. Such information should be of interest to training and command personnel as suggestive material for future guidance that might be provided for use by junior officers. In addition to identifying 13 job areas and 34 specific job functions where performance aids would be useful, the commanders indicated that such aids should be designed to minimize the amount and difficulty of job content that must be learned by the inexperienced officer. (Author)

AD-629 443 Fld. 5/9
CFSTI Prices: HC $1.60 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
MEASURES ON ABILITY AND PROGRAMED INSTRUCTION PERFORMANCE.
Technical rept.,
by William H. Melching. Dec 65, 18p. Rept. no. TR-65-12,
Contract DA-44-188-ARO-2, Proj. DA-2J024701A712-01,
Unclassified report

Descriptors: (*Programmed instruction, Effectiveness), (*Achievement tests, Programmed instruction), Psychometrics, Correlation techniques, Performance tests

The results of several programed instruction studies were compared with regard to the relationship between measures of ability and measures of programed instruction performance. Although there were some exceptions, each ability measure tended to be substantially related to each measure of program-test performance. The contention that programed instruction eliminates achievement differences due to intellectual ability was not substantiated. (Author)

AD-629 573 Fld. 5/9
CFSTI Prices: HC $3.60 MF $0.50
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
EVOLUTION OF A JOB INVENTORY AND TRYOUT OF TASK RATING FACTORS,
by Joseph E. Morsh. Dec 65, 36p. Rept. no. PRL-TR-65-22,
Proj. AF-7734, Task 773401,
Unclassified report

Descriptors: (*Air force personnel, Job analysis), (*Job analysis, Air force personnel), Air force training, Personnel management, Classification, Identification, Learning, Performance (Human), Programming (Computers), Strategic Air Command

The results of surveys of the Personnel Career Field conducted in 1959, 1961, 1963, and 1964 are reported. Improvements in inventory content and format and in administrative procedures were incorporated with each successive survey. In the last 2 surveys incumbents completed a background information sheet and rated the relative time spent on tasks. A computerized hierarchal grouping procedure applied to the time-spent data was used to identify and describe job types. In the 1962 survey 35 significant job types were found. In the 1964 survey 34 job types were identified. Job types tend to cut across commands and to some extent across grades and specialties. In the 1964 survey, in addition to relative time spent, subsamples of incumbents used 4 other task rating factors: technical assistance required, frequency of performance, difficulty of learning by on-the-job training, and training emphasis. Results of the tryout of these ratings are also reported. (Author)

AD-629 574 Fld. 5/9
CFSTI Prices: HC $2.60 MF $0.50
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
A METHOD FOR ESTABLISHING USAF RECRUITING SERVICE GROUP ENLISTMENT OBJECTIVES BASED ON APTITUDE AND INTEREST CHARACTERISTICS,
by Ernest C. Tupes. Nov 65, 30p. Rept. no. PRL-TR-65-20,
Proj. AF-7717, Task 771705,
Unclassified report

Descriptors: (*Air force personnel, Recruiting), (*Recruiting, Air force personnel), Aptitude tests, Population, Urban areas, Distribution, Statistical analysis

Enlistment objectives are presently assigned by the United States Air Force to each of its Recruiting Groups on the basis of the proportion of the general population residing in the area covered by that group. In the present report, information is presented concerning differences in the aptitudes and willingness to serve in the Air Force of potential enlistees in the Recruiting Groups. A method is illustrated whereby enlistment objectives are established which take into account such differences with the result that each Recruiting Group is given a more equitable share of the total enlistment quota. A further revision is suggested which would permit each Recruiting Group to subdivide its own enlistment objectives on the basis of the sizes of the cities and communities within its recruiting area. (Author)

AD-629 575 Fld. 5/9
CFSTI Prices: HC $4.60 MF $0.50
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
OFFICER GRADE REQUIREMENTS PROJECT. II. JOB DESCRIPTIONS, SAMPLE SELECTION, AND CRITERION BOARD,
by Joe T. Hazel. Nov 65, 44p. Rept. no. PRL-TR-65-18,
Proj. AF-7734, Task 773402,
Unclassified report

Descriptors: (*Air force personnel, Officer personnel), (*Officer personnel, Selection), (*Job analysis, Officer personnel), Military requirements, Classification, Standardization, Tables

The Officer Grade Requirements Project was undertaken to determine an optimal Air Force officer grade structure, stated in terms of the number of officers required in grades lieutenant through colonel. Due to its scope, several reports are necessary to explain the project. The first report of the series gave the purpose, phases, and a description of the method and preliminary findings. The present report describes in detail the three following steps of the project: (1) development of a suitable format and collection of standardized job descriptions of the work performed by approximately 80,000 officers; (2) selection of a criterion sample of 3,575 descriptions representing all levels and types of officer jobs; (3) selection and conduct of a Headquarters USAF Policy Board to provide criterion measures (grade ratings for the job sample. (Author)

AD-629 630 Fld. 5/9, 5/10
CFSTI Prices: HC $1.10 MF $0.50
WAKOFF RESEARCH CENTER STATEN ISLAND N Y
PSYCHOSOCIAL FACTORS IN MILITARY DEVIANCE.
Annual rept. Mar 65-Mar 66, (Technical),
by Sheldon Blackman, Kenneth M. Goldstein, Wallace Mandell, and Donald J. Collins. Mar 66, 7p. Rept. no. tr-2,
Contract DA-49-193-MD-2538,
Unclassified report

Descriptors: (*Military psychology, Group dynamics), (*Social psychology, Military personnel), (*Military personnel, Performance (Human)), Behavior, Attitudes, Emotions, Perception (Psychology), Stress (Psychology), Military training, Sociometrics, Psychometrics

The study is the second in a planned program of research designed to make available tested methods of modifying basic training squads that will be useful in improving the performance of military personnel. The theoretical position underlying this work has been summarized in Blackman, Mandell, Goldstein, and Silberstein (1965). Briefly, small groups are conceptualized as consisting of members involved in patterns of reciprocated reinforcement. Insofar as one individual has reinforced another in the past, it is hypothesized that reciprocal reinforcement will be available to him from that individual in the future. The availability of this support helps ward off breakdown in the face of stress. Individuals for whom this support is not available are thus more likely to become incapacitated by stress than are individuals involved in reciprocal relationships. These isolated individuals have been chosen for study. It is posited that there are two dimensions along which such isolation may take place: instrumental (having to do with work relationships), and effective (having to do with emotional relationships). The present study tests the hypothesis that poor performance may be predicted from isolation. A further aim of the present study is to develop techniques for modifying the isolation of squad members to improve performance. (Author)

AD-628 935 **See Fld. 9/2**

AD-629 692 **See Fld. 5/7**

AD-629 694 **See Fld. 5/7**

AD-629 695 **See Fld. 5/7**

5/10. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-628 951 Fld. 5/10
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
SET AND CONTENT SCORES FOR PERSONALITY SCALES AND RESPONSE STYLES IN THE MMPI,
by Paul G. Liberty Jr., Bart M. Vitola, and Jerome S. Pierson. 11 Jun 64, 6p. Proj. AF-7719, Task 771902,
Unclassified report

Prepared in cooperation with Texas Univ., Austin.

Availability: Published in Journal of Applied Psychology, v49 n5 p326-31 1965. Copies to DDC users only.

Descriptors: (*Personality, Psychometrics), Analysis of variance

Set and content scores from 3 MMPI scales, Edwards SD scale, the Manifest Anxiety scale (MA), and the Masculinity-Femininity (Mf) scale, were derived by an adaptation of the Helmstadter technique for obtaining separate (acquiescence) set and content scores from personality scales. In a factor analysis of scores for 150 male college Ss on 54 variables, the MA-Set and SD-Set variables defined a common factor, but only the Mf-Set variable loaded the second, or acquiescence, factor. The inconsistency of these results indicated that the set formula was not consistently measuring, or reflecting, acquiescence, or any other construct, and furthermore suggested the need for caution in making acquiescence interpretations based on the Helmstadter procedure. Some speculations were advanced to account for the disparate results of the set variables, such as the degree of true-false and SD-SUD keying in the 'parent' scales. A systematic variation of such scale keying in future research may indicate what the set procedure is measuring and have potential implications for the clarification of the nature of acquiescence in personality scales. (Author)

AD-628 994 Fld. 5/10, 12/1
CFSTI Prices: HC $1.60 MF $0.50
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE MEDICAL RESEARCH DEPT
PSYCHOPHYSICAL METHODOLOGY I. COMPARISON OF THRESHOLDS OF THE METHOD OF LIMITS AND OF THE METHOD OF CONSTANT STIMULI.
Phase rept.,
by Robert M. Herrick. 31 Dec 65, 18p. Rept. no. nadc-MR-6507,
Task R360-FR-102/2021/R01-101-01,
Unclassified report

Descriptors: (*Thresholds (Physiology), Mathematical analysis), (*Psychophysiology, Analysis), Stimulation, Series, Probability

In 'Yes' - 'No' psychophysical experiments assume that the greater the intensity of the stimulus, the greater the probability of a 'Yes' response. On the basis of this assumption (a) the relationships between the method of limits and the method of constant stimuli are derived, (b) a procedure for comparing data obtained by the two methods is recommended, (c) a procedure for comparing ascending and descending series within the method of limits is given. (Author)

AD-628 995 Fld. 5/10, 12/1
CFSTI Prices: HC $1.60 MF $0.50
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AEROSPACE MEDICAL RESEARCH DEPT
PSYCHOPHYSICAL METHODOLOGY II. COMPARISON OF MEANS AND OF STANDARD DEVIATIONS OF THE ASCENDING AND DESCENDING METHOD OF LIMITS.
Phase rept.,
by Robert M. Herrick. 31 Dec 65, 17p. Rept. no. nadc-MR-6508,
Task R360-FR-102/2021/R01-101-01,
Unclassified report

See also AD-628 994.

Descriptors: (*Psychophysiology, Analysis), (*Thresholds (Physiology), Mathematical analysis), Series, Stimulation, Probability, Statistical analysis

Assume that the probability of a 'Yes' response increases as the stimulus intensity increases. Then, on the basis of probability considerations alone (a) the mean threshold of the descending method of limits (DML) is greater than the mean threshold of the ascending method of limits (AML) and (b) sigma of the DML threshold distribution may be greater than, equal to, or less than sigma of the AML threshold distribution. Therefore, (a) the present method for evaluating errors of expectation and habituation is erroneous, (b) the 'just not noticeable difference' (jnnd) should always be larger than the 'just noticeable difference' (jnd), (c) conclusions about relative precision based on a comparison of sigma s are wrong. (Author)

AD-628 998 Fld. 5/10, 5/11
CFSTI Prices: HC $3.00 MF $0.50
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
SOME METHODOLOGICAL PROBLEMS CONCERNING RESEARCH NEGOTIATIONS BETWEEN MONOLINGUALS.
Technical rept.,
by Harry C. Triandis, Earl E. Davis, Vasso Vassiliou, and Maria Nassiakou. Dec 65, 58p. Rept. no. TR-28,
Contract Nonr-1834 (36) Proj. NR-177-472,
Unclassified report

Prepared in cooperation with The Athenian Inst. of Anthropos.

Descriptors: (*Social communication, Effectiveness), (*Culture, Language), (*Language, Social communication), Problem solving, Bargaining, Attitudes

In order to obtain some experience with the problems associated with research on negotiation between monolinguals, an experiment was conducted in which American and Greek college students negotiated the best way to raise children. Half of the Greek interpreters were linguistically balanced, while the other half were linguistically dominant in favor of Greek; half the interpreters were in favor of the Greek and half in favor of the American positions on child-rearing in a 2 by 2 design. It was found that the interpreters tended to aid the side with which they were in agreement on the issues under negotiation. Observations of the behavior of the negotiators suggested that there are cultural differences in 'negotiation sophistication.' Furthermore, the interpreters responded to an English version of an attitude questionnaire in a manner suggesting a greater influence of social desirability factors than when they responded to a Greek version of the same questionnaire. Finally, the issues of negotiation had different degrees of importance for the negotiators, but a procedure for the control of this variable was developed. (Author)

AD-629 016 Fld. 5/10, 5/11
CFSTI Prices: HC $1.60 MF $0.50
CHILE UNIV SANTIAGO SERVICIO NACIONAL DE SALUD
CROSSCULTURAL DEFINITIONS FOR EPIDEMIOLOGICAL STUDIES IN MENTAL HEALTH.
Annual rept. no. 1 (Final), 1 Feb 65-31 Jan 66, by Jose Horwitz, and Juan Marconi. Dec 65, 19p. Contract DA-ARO-49-092-65-G73, Proj. DA-2N014501B71D-00-023-LA,

Unclassified report

Descriptors: (*Mental disorders, Social psychology), (*Social psychology, Mental disorders), Culture, Group dynamics, Psychometrics, Diagnosis, Psychoses, Neuroses, Addiction, Epilepsy, Epidemiology, Chile

The following established definitions are given on which to base studies: operational definitions of alcoholism, epilepsy, dementia, and oligophenia at conditional or pathogenic level; psychosis at structural level based on awareness of reality; neurosis at ostensive or symptomatic level. Conditions for transcultural validity of psychological testing are established. A pilot survey has been carried out in Santiago and on Mapuche reservations near Temuco. These will aid in refining procedures for future study. (Author)

AD-629 034 Fld. 5/10
MICHIGAN UNIV ANN ARBOR RESEARCH CENTER FOR GROUP DYNAMICS
STIMULUS GENERALIZATION AS A FUNCTION OF DRIVE SHIFT,
by Robert B. Zajonc, and David V. Cross. 10 Feb 64, 8p. Contract AF 49 (638)-367, Proj. AF-9778, Task 977803,
AFOSR 65-2156

Unclassified report

Availability: Published in Journal of Experimental Psychology v69 n4 p363-8 Apr 1965. Copies to DDC users only.

Descriptors: (*Starvation, Motivation), (*Motivation, Visual perception), (*Perception (Psychology), Motivation), Training

Six pigeons reduced to 70% and 6 reduced to 90% of their body weight were trained to discriminate a 10-mm. circular spot from 4- and 16-mm. spots. Following training, Ss in the 1st group were raised to 90% and Ss in the 2nd dropped to 70% of their body weight. All birds were tested for generalization to spots 6, 8, 10, 12, and 14 mm. in diameter. Following brief discrimination retraining the birds were returned to their original body weights and again tested for generalization. The generalization gradients were found to shift toward larger stimuli when drive level was raised and toward smaller stimuli when it was lowered. (Author)

AD-629 100 Fld. 5/10
DEFENCE RESEARCH MEDICAL LABS TORONTO (ONTARIO)
DETERIORATION OF SIGNAL DETECTABILITY DURING A VIGILANCE TASK AS A FUNCTION OF BACKGROUND EVENT RATE,
Research paper,
by Jane F. Mackworth. 1965, 2p. Rept. no. DRML-RP-616,
Proj. D77-94-20-42,

Unclassified report

Availability: Published in Psychon. Sci., v3 p421-2 1965. Copies to DDC users only.

Descriptors: (*Attention, Visual perception), (*Visual perception, Visual signals), Degradation, Background, Brightness, Performance (Human), Decision making, Probability, Statistical analysis, Canada

In the course of a 30 min. session a significant decrease was found in detection and detectability (d') of a slighter brighter flash against a background flash rate of 200/min. No such decrement occurred when the background flash rate was 40/min. In both cases the signal rate was 6/min. (Author)

AD-629 102 Fld. 5/10
DEFENCE RESEARCH MEDICAL LABS TORONTO (ONTARIO)
PRESENTATION RATE, REPETITION, AND ORGANIZATION IN AUDITORY SHORT-TERM MEMORY.
Research paper,
by Jane F. Mackworth. 12 Nov 64, 13p. Rept. no. DRML-RP-532,
Proj. D77-94-20-46,

Unclassified report

Availability: Published in Canad. J. Psychol/Rev. Canad. Psychol, v19 n4 p304-15 1965. Copies to DDC users only.

Descriptors: (*Recall, Speech), Auditory perception, Auditory signals, Vocabulary, Psychometrics, Memory, Learning, Canada

Four auditory experiments are described which study the effect of repetition on immediate recall of series of letters or digits. The variables investigated were presentation rate, message length, and organization. Recall from slow presentation differed from fast in nearly all cases, but the differences were complex. With rhythmic presentation, recall was better at the faster presentation rate but showed relatively little improvement with repetition, while there was greater loss of recall with the fast presentation when the message length was increased. With non-rhythmic presentation, recall from the fast single presentation was less, but greater improvement with repetition was noted. These results are discussed in terms of the decay theory. (Author)

AD-629 144 Fld. 5/10
PRINCETON UNIV N J DEPT OF PSYCHOLOGY
CONTINGENT DISCRIMINATION IN HUMANS,
by Mymon Goldstein, and Robert J. Weber. 9 Jun 65, 8p. Contract AF-AFOSR-62-197,
AFOSR 65-2662

Unclassified report

Prepared in cooperation with Kenyon Coll., Gambier, Ohio.

Availability: Published in Perceptual and Motor Skills, v21 p171-6 1965. Copies to DDC users only.

Descriptors: (*Visual perception, Psychometrics), Performance (Human), Perception (Psychology), Visual signals, Display systems, Identification, Decision making, Errors

Six groups of 10 human Ss, 14- to 18-yr.-old, performed 4-display contingent discrimination tasks in which reinforcement was governed by 1 of 2 possible extra stimuli added to otherwise conventional discrimination displays. Each extra stimuli was related either to the identity or the position of the correct choice. Few errors occurred when identity of correct choice was relevant, but many more errors and some failures to reach criterion occurred when position of correct choice was relevant for some or all of the displays. (Author)

AD-629 146 Fld. 5/10
PRINCETON UNIV N J DEPT OF PSYCHOLOGY
ABSOLUTE AND DIFFERENTIAL CUING OF SUCCESSIVE REVERSALS,
by Mymon Goldstein, and Bennett G. Galef Jr.. 9 Jun 65, 10p. Contract AF-AFOSR-62-197,

AFOSR 65-2660

Unclassified report

Availability: Published in Perceptual and Motor Skills v21 p159-66 1965. Copies to DDC users only.

Descriptors: (*Visual perception, Psychometrics), Performance (Human), Perception (Psychology), Visual signals, Display systems, Identification, Decision making, Errors

Successive reversals for a single pair of stimulus alternatives were signalled by means of a 'differential' cuing method or 1 of 2 'absolute' cuing methods. Under differential cuing, there were 2 extra stimuli that corresponded to reversal and nonreversal, respectively. Under absolute cuing, there was only 1 extra stimuus, but its absence served as 1 signal and its presence served as another. Both possible ways of pairing presence vs absence with reversal vs nonreversal were studied. There were 30 human Ss divided equally among the 3 methods. Differential cuing was the most difficult method. Absolute cuing was least difficult when presence of the extra stimulus was coupled with reversal and absence of the extra stimulus with nonreversal. (Author)

AD-629 147 Fld. 5/10
DELAWARE UNIV NEWARK CENTER FOR RESEARCH ON SOCIAL BEHAVIOR
SOME CORRELATES OF THE DON'T-KNOW RESPONSE IN OPINION QUESTIONNAIRES,
by Robert C. Ziller, and Barbara H. Long. 14 Apr 64, 11p. Contract AF-AFOSR-62-95, Proj. AF-9778, Task 977802,
AFOSR 65-2661

Unclassified report

Availability: Published in The Journal of Social Psychology v67 p139-47 1965. Copies to DDC users only.

Descriptors: (*Social psychology, Behavior), (*Decision making, Social psychology), Attitudes, Motivation, Psychometrics, Personality, Analysis of variance

Two experiments were reported investigating some of the correlates of the don't-know response on a general opinion questionnaire. The don't-know response or withholding judgment was proposed as basic component of the decision-making process involved in questionnaire-response behavior. The first study involved male and female teachers in three age groups: under 30, 30 to 39, and 40 and above. The second study involved freshman, sophomore, junior, and senior college students of both sexes. It was found that the middle age group and students in their junior year used the don't-know response least. Interpreting the avoidance

of the don't-know response as an indicator of dogmatism, it was proposed that dogmatism is a status-defense mechanism. In addition, the relationships are reported of withholding judgment with Rokeach's Dogmatism Scale and measures of intelligence. Implications for the interpretation of questionnaire data are discussed. (Author)

AD-629 265 Fld. 5/10
ISRAEL INST OF APPLIED SOCIAL RESEARCH JERUSALEM
NEW DEVELOPMENTS IN FACET DESIGN AND ANALYSIS,
by Uriel G. Foa. 18 Feb 64, 16p. Contract AF 61 (052)-121 ,PHS-M-2669
AFOSR 65-2674

Unclassified report

Availability: Published in Psychological Review v72 n4 p262-74 Jul 1965. Copies to DDC users only.

Descriptors: (*Multivariate analysis, Psychology), (*Experimental design, Decision making), Language, Semantics, Scientific research, Set theory, Analysis of variance, Israel

In multivariate research design the systematic definition of the set of variables in terms of more basic sets, the facets, leads to the prediction of the empirical interrelationship among the variables. 2 principles are suggested for predicting the results from the facet structure of the variables: the principle of contiguity and the semantic principal components. The application of these concepts to a number of studies in different behavioral areas suggests that they have predictive power. It is further shown that facet elements can be classified into specific and nonspecific to the set of variables and that variables containing specific elements tend to be related to the set of variables more than variables containing nonspecific elements. Systematic design alone does not guarantee correct prediction of empirical results. In fact, for a given area of behavior several alternative formalizations appear possible, and they will usually lead to different hypotheses. While the choice of a given facet design rather than another may depend on the intuition of the investigator, it appears also to be related to the psychology of concept formation and to the influence of language on this process. (Author)

AD-629 300 Fld. 5/10
TUFTS UNIV MEDFORD MASS INST FOR PSYCHOLOGICAL RESEARCH
REMARKS ON THE RELATION BETWEEN PERCEPTION AND MOTION,
by S. J. Freedman. 1964, 11p. Contract AF 49 (638)-1282,
AFOSR 65-2679

Unclassified report

Availability: Published in Bel-Air Symposium (2nd) p298-306 1965. Desafferentation Experimentale et Clinique, Georg and Cie, Geneva. Stimulated by discussions. Copies to DDC users only.

Descriptors: (*Sensory perception, Motor reactions), (*Space perception, Motor reactions), Proprioception, Visual perception, Auditory perception, Motion, Perception (Psychology), Body, Motion, Sensation (Physiology), Performance (Human), Sensory deprivation

Experiments (auditory-motor and visual-motor) over the last ten years in several different laboratories have implicated the necessity of self-produced movements for either the compensatory adaptation or the deterioration of perceptual-motor performance to occur. Whether the change in the nature of motor-sensory relationships is systematic or asystematic, whether it is time-independent or time-varied, there has been no significant alteration of perception and perceptual-motor performance, unless the observer is permitted free movement. The experiments imply that the stability of spatial perception and spatially-oriented behavior depends upon continued contact with the customary sense-stimulating environment. The processes which are described appear also to play a critical role in the development of effective perceptualmotor coordination, and may be related conceptually to Piaget's concepts of assimilation, accommodation and alimentation in the development of the sensori-motor schemata which he considers requisite to intelligence. (Author)

AD-629 382 Fld. 5/10
WASHINGTON STATE UNIV PULLMAN
SHORT-TERM RETENTION AS A FUNCTION OF ITEM FREQUENCY,
by Kenneth E. Lloyd. 4 May 64, 7p. Contract AF 49 (638)-805, Proj. AF-9778, Task 977801, AFOSR 65-2164

Unclassified report

Availability: Published in The Journal of Psychology v58 p249-53 1964. Copies to DDC users only.

Descriptors: (*English language, Memory), (*Retention, Vocabulary), Frequency, Recall, Achievement tests, Learning

The daily frequency of occurrence of items (letter-word pairs) was varied in a sequential memory task. In this task, S continually received information and, at unpredictable moments, was requested to recall some of it. Two groups of Ss which differed in the range of variation in item frequencies in the sequences presented to them were compared. Total recall was directly related to range of item frequency ($p < .01$). High-frequency items in a high-range group were recalled more often than medium-frequency items in a narrowrange group ($p < .01$). Items with a low frequency in both the groups were recalled most often by the highest-range group ($p < .05$). The facilitation of recall in the highest-range groups was not limited to the high-frequency items. (Author)

AD-629 383 Fld. 5/10
WASHINGTON STATE UNIV PULLMAN
SHORT-TERM RETENTION AS A FUNCTION OF WORD FREQUENCY,
by Kenneth E. Lloyd. 11 Nov 63, 7p. Contract AF 49 (638)-805, Proj. AF-9778, Task 977801, AFOSR 65-2165

Unclassified report

Availability: Published in Journal of Verbal Learning and Verbal Behavior v3 n4 p286-8 Aug 1964. Copies to DDC users only.

Descriptors: (*English language, Memory), (*Retention, Vocabulary), Frequency, Recall, Achievement tests, Learning

The English text frequency of words used in a sequential-memory task was manipulated. In this task S continually received new words to be remembered, and, at unpredictable moments, was requested to recall some of them. Three groups of Ss were compared. One group was presented high-frequency words, another low-frequency words, and a third was presented words which varied in frequency over a wide range. Recall varied as a function of word frequency. Differences in recall were greater when the memory requirements of the task were low than when they were high. (Author)

AD-629 566 Fld. 5/10
KANSAS STATE UNIV MANHATTAN
TASK PREDICTABILITY IN THE ORGANIZATION, ACQUISITION, AND RETENTION OF TRACKING SKILL,
by Don Trumbo, Merrill Noble, Kenneth Cross, and Lynn Ulrich. 14 May 64, 14p. Contract AF-AFOSR-62-17,
AFOSR-65-2659

Unclassified report

Availability: Published in Journal of Experimental Psychology v70 n3 p252-63 1965. Copies to DDC users only.

Descriptors: (*Tracking, Performance (Human)), Reaction (Psychology), Reflexes, Perception (Psychology), Learning, Recall, Motor reactions, Training

Two hundred fifty male students were assigned to 4 conditions oftask predictability, 3 retention intervals, and 2 levels of training in a 4 X 3 X 2 design. Predictability was determined by irregular step-function tasks that differed in the proportions of systematically repeating (predictable) targets, ranging from fixed to random sequences. Integrated absolute error served as a performance criterion. In addition, 6 indexes of temporal-spatial patterning were obtained. Results showed greatest improvement and greatest absolute retention losses for the fixed task and a fixed-direction task added to the design. Intermediately predictable tasks did not differ in error from the random task; however, differences in response organization were found among all tasks. Results suggest the nature of changes in response organization, and indicate that timing may be most crucial for acquiring and maintaining skill. (Author)

AD-629 594 Fld. 5/10
CFSTI Prices: HC $2.00 MF $0.50
CINCINNATI UNIV OHIO
REVIEW OF MNEMONICS AND MNEMONOTECHNICS FOR IMPROVED MEMORY.
Final rept. Jun-Oct 65,
by R. J. Senter. Dec 65, 27p. Contract AF 33 (615)-1046, Proj. AF-1710, Task 171004, AMRL-TR-65-180

Unclassified report

Descriptors: (*Memory, Training), Recall, Retention, Learning, Word association, Reviews

A review is made of books on mnemonics and mnemonotechnics. These are techniques for improving the efficiency of memory. These books describe the effect on memory of common principles of learning, such as, motivation, attention, and rehearsal. They also illustrate the use of simple mnemonics, such as 'ROY G. BIV' for remembering the hues of the visual spectrum. More extensive descriptions, however, are provided of more complex mnemonic systems, such as, the so-called 'hook' or 'peg' systems: With the hook system, information in serial order is retained by aid of vivid, even bizarre, visual images. The information to be retained is incorporated into a visual image which had been previously associated with a number. The report includes some uses of these techniques and some personal observations and analyses. These techniques offer interesting possibilities for improving the retention of technical information. Research on these techniques probably would be profitable. (Author)

AD-629 677 Fld. 5/10
CFSTI Prices: HC $1.60 MF $0.50
PSYCHOPHYSICS LAB UNIV OF WASHINGTON SEATTLE
A NOTE ON SOME ALTERNATIVE MODELS FOR RESPONSE BIAS CHANGES DURING FORCED-CHOICE DETECTION EXPERIMENTS.
Technical rept.,
by Don A. Ronken. 1 Nov 65, 13p. Rept. no. plr-13N,
Contract Nonr-477 (34)

Unclassified report

Descriptors: (*Decision making, Detection), (*Detection, Decision making), (*Learning, Mathematical models), (*Reaction (Psychology), Mathematical prediction), Signals, Information theory, Feedback, Stochastic processes, Psychophysiology

Several variants of a learning model for forced-choice detection experiments (Atkinson and Kinchla, 1965) may be produced by making various

reasonable assumptions regarding which events are effective in producing response bias changes. Atkinson and Kinchla assumed the bias changed according to a single parameter stochastic learning mechanism, such changes occurring only when no signal was detected. An alternative formulation uses two learning parameters and postulates the bias changes on every trial, but at different rates, according to whether or not the signal is detected. This two-parameter bias model was applied to the original data (Atkinson and Kinchla, 1965), and produced numerical estimates of the parameters which confirm the conjecture that the bias changes principally during non-detection trials. In addition, the parameter estimates indicate that the relative effectiveness of information feedback is determined by its relative frequency of occurrence, an interpretation which was not possible from the single-parameter model. (Author)

AD-629 678 Fld. 5/10
CFSTI Prices: HC $4.60 MF $0.50
PSYCHOPHYSICS LAB UNIV OF WASHINGTON SEATTLE
STUDIES OF THE CONSTANT ERROR.
Technical rept.,
by Don A. Ronken, and Eugene Galanter. 1 Nov 65, 41p. Rept. no. plr-14N,
Contract Nonr-477 (34)

Unclassified report

Descriptors: (*Decision making, Psychometrics), (*Psychometrics, Decision making), Stimulation, Memory, Images, Retention, Errors, Psychophysiology

A series of experiments are reported in which attempts are made to study the role of stimulus variables that may affect the magnitude of the constant error. The results indicate that in addition to bias effects that cannot rightly be ascribed to the stimulus, there are certain forms of potential sequential biases that may or may not be stimulus induced. The classical experiment to investigate the phenomenon is redesigned, and some preliminary results are presented to show that the technique is feasible. (Author)

AD-629 679 Fld. 5/10
CFSTI Prices: HC $1.60 MF $0.50
PSYCHOPHYSICS LAB UNIV OF WASHINGTON SEATTLE
ON THE INADEQUACIES OF A LIMITED-STATE THEORY OF THE THRESHOLD.
Technical rept.,
by Moncrieff H. Smith,Jr.. 1 Nov 65, 19p. Rept. no. plr-15N,
Contract Nonr-477 (34)

Unclassified report

Descriptors: (*Psychometrics, Reaction (Psychology), (*Reaction (Psychology), Psychometric), (*Decision making, Psychometrics), Detection, Thresholds (Physiology), Mathematical models, Psychophysiology

A three-state model of detection, based very closely on Luce's two state model, has been proposed and examined in the context of the psychophysical experiment. Although most of the data used to test the model are of doubtful relevance, being of the confidence -judgment variety, they do serve to warn of the possibility of individual differences between subjects. Some subjects may shift from one attitude to another by a change in pure response bias. For most subjects, however, including one run under appropriate conditions, the data did not support the model. (Author)

AD-629 680 Fld. 5/10
CFSTI Prices: HC $2.60 MF $0.50
PSYCHOPHYSICS LAB UNIV OF WASHINGTON SEATTLE
ON THE NATURE OF LAWS IN PSYCHOLOGY.
Technical rept.,
by Eugene Galanter. 1 Nov 65, 23p. Rept. no. plr-16N,
Contract Nonr-477 (34)

Unclassified report

Descriptors: (*Psychology, Theory), Reaction (Psychology), Learning, Recall, Perception (Psychology)

Arguments are presented support the point of view that psychological laws are most appropriately sought among response-response relations. Examples drawn from the psychology of learning, remembering, and perceiving are used to illustrate the argument. (Author)

AD-629 697 Fld. 5/10
WASHINGTON STATE UNIV PULLMAN
NOTE ON INDIVIDUAL STORAGE LOADS AND INDIVIDUAL LOAD REDUCTIONS,
by Kenneth E. Lloyd. 13 Apr 65, 4p. Contract AF-AFOSR-256-63, Proj. AF-9778, Task 977801,
AFOSR 65-2669

Unclassified report

Availability: Published in Psychological Reports v16 p995-6 1965. Copies to DDC users only.

Descriptors: (*Memory, Psychometrics), (*Recall, Psychometrics), Language, Distribution

Sequential memory tasks require E to construct a sequence of items to be remembered and cues to recall these items. In a series of studies sequences were constructed in terms of the average number of items S was remembering at a recall point and of the average number of items S was asked to recall at a recall point. These averages were based on values assigned to individual items and recall points. The study systematically varied the distribution of these individual values that formed the averages. Bimodal distributions affected recall differently from symmetrical distributions. (Author)

AD-628 944 See Fld. 5/9

AD-628 959 See Fld. 6/19

AD-629 093 See Fld. 6/16

AD-629 278 See Fld. 9/2

AD-629 520 See Fld. 12/2

AD-629 624 See Fld. 6/16

AD-629 630 See Fld. 5/9

5/11. SOCIOLOGY

AD-629 234 Fld. 5/11, 5/4
HEBREW UNIV JERUSALEM (ISRAEL)
SOCIAL CHANGE AND MODERNIZATION IN AFRICAN SOCIETIES SOUTH OF THE SAHARA,
by S. N. Eisenstadt. 1964, 22p. Contract AF-EOAR-23-64,
AFOSR 65-2665

Unclassified report

Presented at Georgetown University's Anniversary's Conference on French-speaking Africa South of Sahara (175th), Washington, D. C. Aug 17-22 1964.

Availability: Published in Cahiers d'Etudes Africaines no. 19, p453-71. Copies to DDC users only.

Descriptors: (*Subsaharan Africa, Sociology), Economy, Political science, Labor, Israel

AD-629 235 Fld. 5/11
UNIVERSITY COLL OF WALES ABERYSTWYTH
PROCESSES OF MODERNIZATION AND OF URBAN AND INDUSTRIAL TRANSFORMATION UNDER CONDITIONS OF STRUCTURAL DUALITY,
by S. N. Eisenstadt. 1964, 14p. Contract AF-EOAR-23-64,
AFOSR 65-2670

Unclassified report

Presented to the Latin American Congress of Sociology (7th), 1964.

Availability: Published in International Social Science Council v4 p40-50 Mar 1965. Copies to DDC users only.

Descriptors: (*Sociology, Urban areas), (*Urban areas, Sociology), Urban planning, Industries, Transformations, Housing, Rural areas, Attitudes, Social communication, Political science, Asia, Latin America, Great Britain

In the cases analyzed, there tended to develop, in almost all the institutional spheres, a situation of growing interaction between different groups and strata, of their being drawn together into new common frameworks, of growing differentiation and at the same time lack of adequate mechanism to deal with the problems attendant on such internal differentiation and on the growing interaction between the various groups. This coming together of different groups into common social frameworks may have been intermittent and unequally distributed between different groups and strata of the population. But from all these points of view it is extremely doubtful whether it differed greatly from developments in other modernizing or modern societies at similar levels of modernization which were more successful in establishing relatively stable institutional frameworks. The crucial problem of these societies has been not a relatively small extent of modernization but rather the lack of development of new institutional settings, regulative mechanism and normative injunctions upheld within strategic areas of the social structure and capable of dealing with the various problems, which arose in all these spheres.

AD-628 998 See Fld. 5/10

AD-629 016 See Fld. 5/10

Field 6-BIOLOGICAL AND MEDICAL SCIENCES

6/1. BIOCHEMISTRY

AD-628 905 Fld. 6/1, 7/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
INTERACTION BETWEEN CHLOROPHYLL AND HYDROQUINONE.
Physical sciences research papers,
by Eiji Fuimori, and Maria Tavla. 1965, 12p.
Rept. no. AFCRL-PSRP-179 ,AFCRL-65-893
Proj. AF-8659, Task 865903,

Unclassified report

Availability: Published in Nature v208 n5005 p78-9 2 Oct 1965. Copies to DDC users only.

Descriptors: (*Photosynthesis, Oxidation-reduction reactions), (*Chlorophyll, Oxidation-reduction reactions), (*Quinones, Photochemistry), Electrochemistry, Electron spin resonance, Hyperfine structure, Free radicals, Oxygen, Complex compounds

Photovoltaic studies of chlorophyll-hydroquinone system showed that its redox-potential decreases in light and returns to the initial value in darkness. This negative change upon irradiation indicates that chlorophyll undergoes photoreduction and its couple is responsible for the photovoltaic effect. Degassed methanol solutions of chlorophyll a with hydroquinone exhibit two kinds of lightinduced ESR-signal. One shows a hyperfine structure, which is characteristic of p-benzosemiquinone free radical, and the other is a broader signal probably

from reduced chlorophyll. This indicates direct one-electron transfer from hydroquinone to chlorophyll. In the presence of air, a new broad ESR-signal, from chlorophyll-oxygen complex, appears together with the hyperfine structure observed in the air-free system. This shows that free radicals which are formed by interaction with oxygen undergo further reaction with hydroquinone to produce additional free radicals in the oxidation of hydroquinone. These results are discussed from the specific aspects of chlorophyll photochemistry in photosynthesis. (Author)

AD-629 258 Fld. 6/1
OXFORD UNIV (ENGLAND) DEPT OF PHARMACOLOGY
THE ADENOSINE-TRIPHOSPHATASE ACTIVITY OF ADRENAL CHROMAFFIN,
by P. Banks. 9 Sep 64, 10p. Contract AF-EOAR-12-64,
AFOSR 65-2857

Unclassified report

Availability: Published in Biochem. Journal v95 p490-6 1965. Copies to DDC users only.

Descriptors: (*Adenosine phosphates, Chemoreceptors), Adrenal glands, Amines, Granules, Bovines, Mitochondria, Microsomes, Electron microscopy, Great Britain

The preparation of a fraction containing highly purified chromaffin granules from the bovine adrenal medulla is described. The fraction contains an adenosine-triphosphatase activity that is stimulated by Mg2+ and that cannot be explained by contamination with mitochondria or microsomes. It is suggested that the adenosine-triphosphatase activity is related to the uptake of catecholamines by the chromaffin granules. (Author)

AD-629 259 Fld. 6/1
OXFORD UNIV (ENGLAND) DEPT OF PHARMACOLOGY
THE AMINE OXIDASE OF PIG PLASMA IN COPPER DEFICIENCY,
by H. Blaschko, Franca Buffoni, N. Weissman, W. H. Carnes, and W. F. Coulson. 6 Apr 65, 4p. Contract AF-EOAR-12-64 ,PHS-HE-05609
AFOSR 65-2856

Unclassified report

Prepared in cooperation with Utah Univ., Salt Lake City. Coll. of Medicine.

Availability: Published in Biochem. Journal v96 p4c-5c 1965. Copies to DDC users only.

Descriptors: (*Diamine oxidase, Deficiency diseases), (*Deficiency diseases, Copper), Swine, Blood serum, Cardiovascular system, Proteins, Diet, Enzymes, Catalysis, Great Britain

The amine-oxidase ('benzylamine-oxidase' or histaminase) activity of the blood serum of copper-deficient pigs was studied. Observations on the biochemical basis of the cardiovascular changes in copper-deficient pigs were made and the amine oxidase of pig plasma was crystallized and shown to be a copper-containing protein. Samples from animals maintained on a diet deficient in copper were examined for their amine-oxidase activity. The freezedried material was tested manometrically, with 10mM -benzylamine as substrate. The samples included material collected not only from deficient animals but also from animals that had received copper after a first sample had been collected while they were copper-deficient. The results show that in the deficient animals enzymic activity was either absent or extremely low. Under copper therapy the enzymic activity made its appearance. These observations are of interest in relation to the role of copper in enzymic processes. Although in the experiments the mechanism of action of copper was not studied it is believed that the pig plasma enzyme belongs to a group of oxidases in which copper is an essential constituent of the catalytic system. From what is known of the chemistry of related enzymes, the bovine spermine oxidase, the pea-seedling amine oxidase and the diamine oxidase of pig kidney, it is clear that the whole group of amine oxidases sensitive to cyanide and to carbonyl reagents represents a new type of copper-containing protein with catalytic activity.

AD-629 282 Fld. 6/1, 7/3, 7/4
STANFORD UNIV CALIF DEPT OF CHEMISTRY
THE CONFIGURATION OF RANDOM POLYPEPTIDE CHAINS. I. EXPERIMENTAL RESULTS,
by David A. Brant, and Paul J. Flory. 6 Mar 65, 6p. Contract AF 49 (638)-1341,
AFOSR 65-2376

Unclassified report

See also AD-628 283.

Availability: Published in Journal of the American Chemical Society v87 n13 p2788-91 July 5 1965. Copies to DDC users only.

Descriptors: (*Peptides, Molecular structure), (*Polymers, Molecular structure), Stereochemistry, Molecular isomerism, Glutamic acid, Amino acids, Experimental data

A dimensionless characteristic ratio of the measured mean square unperturbed end-to-end distance (r squared)o to the number np of planar, trans peptide units multiplied by the square of the length lp between successive alpha-carbons has been evaluated for four polypeptides. Measurements reported on poly-beta-benzyl-L-aspartate in m-cresol at 100, on poly-L-glutamic acid in aqueous 0.3 M sodium phosphate at pH 7.85 and 37, and on poly-L-lysine in aqueous 1.0 M sodium bromide at pH 4.54 and 37 yielded values of the characteristic ratio of 9.6, 8.8, and 8.6, respectively. From the data of Doty, Bradbury, and Holtzer for poly-gamma-benzyl-L-glutamate in dichloroacetic acid at 25, (J. Am. Chem. Soc. 78:947, (1956)), a value of 8.8 was calculated. No dependence of the unperturbed dimensions upon the solvents or amino acid side chains represented is discernible within the estimated experimental uncertainty of ca. 10%. (Author)

AD-629 288 Fld. 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
ON THE OXIDATION-REDUCTION POTENTIAL OF THE PHOTOPRODUCED REDUCTANT OF ISOLATED CHLOROPLASTS,
by Gunter Zweig, and Mordhay Avron. 11 Mar 65, 5p. Contract AF-EOAR-19-64, Proj. AF-9777, Task 977701,
AFOSR 65-2858

Unclassified report

Availability: Published in Biochemical and Biophysical Research Communications v19 n4 p397-400 1965. Copies to DDC users only.

Descriptors: (*Chloroplasts, Photochemistry), Oxidation-reduction reactions, Pyridines, Reduction (Chemistry), Israel

Observations that the experimentally obtained value for the redox potential of the photoproduced reductant in isolated chloroplasts is about -0.5 volts and that ferredoxin is not required for the photoreduction of diquat (1,1'-ethylene, 2,2'-dipyridylium dibromide), led to the conclusion that ferredoxin may not be the endogenous reductant with the most negative oxidation-reduction potential. (Author)

AD-629 294 Fld. 6/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) DEPT OF BIOPHYSICS
SYNTHESIS OF TRITIATED POLY-L-LYSINE (GAMMA, DELTA-T2),
by M. Fridkin, M. Sokolovsky, and E. Katchalski. 29 Jan 64, 9p. Contract AF-EOAR-59-63,PHS-RG-235103 Proj. AF-9777, Task 977701,
AFOSR 65-2172

Unclassified report

See also AD-611 183.

Availability: Published in Biopolymers, v2 p123-9 1964. Copies to DDC users only.

Descriptors: (*Amine acids, Synthesis (Chemistry)), Polymers, Reptides, Malonic acids, Tritiated compounds, Tracer studies, Enzymes, Israel

Tritiated poly-L-lysine (gamma, delta-T2) (IX) was prepared according to the following procedure: Tritiated DL-lysine (gamma, delta-T2) (III) was derived from acetamino- (4-amino-delta (2)-butenyl)diethylmalonate (I) by tritiation followed by acid hydrolysis. The racemic tritiated lysine was converted to its epsilon, N-trifluroracetly derivative IV, and the latter resolved via its chloroacetyl derivative by means of hog kidney acylase. The optically active tritiated epsilon, N-tribluoroacetylL-lysine (VI) was converted into the corresponding N-carboxyanhydride VII with phosgene, and polymerization carried out in dioxane using triethylamine as initiator. The required tritiated poly-Llysine (IX, n = 250) was obtained from the blocked polymer VIII after removal of the protecting groups with piperidine. The tritiated polypeptide possessed an activity of 250 mC. per mole lysine residue. The procedure described enables, however, the preparation of poly-L-lysine with up to 25 times higher specific activity. (Author)

AD-629 317 Fld. 6/1, 6/16
ARMY MEDICAL RESEARCH AND NUTRITION LAB DENVER COLO
FACTORS INFLUENCING THE UTILIZATION OF KETONE BODIES BY MOUSE ADIPOSE TISSUE,
by Richard W. Hanson, and Zigmund Z. Ziporin. 13 May 65, 6p.

Unclassified report

Availability: Published in Journal of Lipid Research v7 p56-61 Jan 1966. Copies to DDC users only.

Descriptors: (*Ketones, Metabolism), (*Adipose tissue, Ketones), Oxidation, Fatty acids, Lipids, Enzymes, Nucleotides, Coenzymes, Oxidoreductases, Saccharide phosphates, Amides, Nicotinic acid, Mice

Factors influencing the utilization of ketone bodies by mouse adipose tissue in vitro were studied. Epididymal fat pads can oxidize DL-beta-hydroxybutyrate-3-14C and aceto-acetate-3-14C to 14CO2 as well as convert these compounds to fatty acid-14C. An increased output of 14CO2 from beta-hydroxybutyrate-3-14C was noted in response to glucose plus insulin, succinate, oxaloacetate, L-asparate, and L-malate. Fatty acid synthesis from beta-hydroxybutyrate was enhanced by glucose plus insulin, L-aspartate, L-malate, oxaloacetate, and citrate. Nicotinamide stimulated the oxidation of beta-hydroxybutyrate but not of acetoacetate of CO2, and did not affect fatty acid synthesis from either ketone body. Nicotinamide increased NAD+ and NADP+ levels in epididymal fat pads without affecting the concentration of NADH and NADPH. 'Superlipogenesis' caused by fasting the mice for 48 hr and re-feeding them for 24 hr sharply enhanced CO2 output and lipogenesis from beta-hydroxybutyrate. The activities of glucose-6-phosphate dehydrogenase, 6-phosphogluconic dehydrogenase, NADP-malic dehydrogenase, and citrate cleavage enzyme from mouse adipose tissue were increased during 'superlipogenesis.' Free fatty acid release by epididymal fat pads in vitro was slightly increased by beta-hydroxybutyrate. The relationship of ketone body metabolism and lipogenesis in adipose tissue is discussed. (Author)

AD-629 329 Fld. 6/1, 6/16
ARMY MEDICAL RESEARCH AND NUTRITION LAB DENVER COLO

ADAPTIVE CHANGES IN ENZYME ACTIVITY AND METABOLIC PATHWAYS IN ADIPOSE TISSUE FROM MEAL-FED RRRATS,
by Gilbert A. Leveille, and Richard W. Hanson.
13 Aug 65, 10p.

Unclassified report

Availability: Publishee in Journal of Lipid Research, v7 p46-55 Jan 1966. Copies to DDC users only.

Descriptors: (*Enzymes, Adipose tissue), (*Adipose tissues, Metabolism), (*Carbohydrates, Diet), (*Fats, Diet), Adaptation (Physiology), Nutrition, Ingestion (Physiology), Oxidoreductases, In vitro analysis, Citrates, Fatty acids, Lipids, Synthesis, Rats

A number of metabolic factors and the activity of a number of enzymes were determined in meal-fed (animals fed a single daily 2 hr meal) and nibbling (ad libitum-fed) rats. The dependency of the observed adaptive changes on the ingestion of carbohydrate was studied by feeding diets high in carbohydrate or fat. Glucose-6-phosphate dehydrogenase and NADP-malic dehydrogenase were more active in adipose tissue from high carbohydrate meal-fed rats than in tissue from ad libitum-fed rats. The activity in adipose tissue of isocitric dehydrogenase, 6-phosphogluconate dehydrogenase, and NAD-malic dehydrogenase did not increase significantly in response to mealfeeding the high carbohydrate diet. No increase in lipogenesis or enzyme activity could be demonstrated in adipose tissue from rats meal-fed a high fat diet. Lipase activity of adipose tissue was increased by high carbohydrate meal-feeding and decreased by feeding a high fat diet. The in vitro uptake of palmitate-1- (14)C more rapidly than did tissue from ad libitum-fed animals. Evidence is presented for the quantitative importance of citrate as a source of extramitochondrial acetyl CoA in adipose tissue of meal-eating and ad libitum-fed rats. The relationship of extramitochondrially formed citrate to the NADmalic dehydrogenase-malic enzyme system in adipose tissue is discussed. (Author)

AD-628 899 **See Fld. 6/16**

AD-629 053 **See Fld. 6/17**

AD-629 067 **See Fld. 6/19**

AD-629 461 **See Fld. 6/3**

AD-629 462 **See Fld. 6/3**

AD-629 550 **See Fld. 17/2**

6/3. BIOLOGY

AD-628 927 Fld. 6/3
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
A NEW INSTRUMENT FOR PRECISION CYTOPHOTOMETRY,
by E. L. Alpen. 22 Dec 5, 35p. Rept. no. USNRDL-TR-959, NAVMED MR005.08-1200-9

Unclassified report

Descriptors: (*Spectrophotometers, Cells (Biology)), (*Cells (Biology), Microphotometers), Absorption (Biological), Optical equipment, Digital systems

A new instrument was designed for the microspectrophotometric measurement of absorbing substances in individual biological cells. The objective was to produce an instrument capable of the highest possible precision of measure. It was demonstrated that a coefficient of variation of less than 1% is possible. The instrument consists of a mechanically rigid optical system and a unique detection and digital conversion system. The applicability of the instrument for the two-wavelength system of measurement is described in detail. (Author)

AD-629 079 Fld. 6/3
CFSTI Prices: HC $2.00 MF $.50
WASHINGTON STATE UNIV PULLMAN PRIMATTTE RESEERCH CENTER
ULTRASOUND AND PHAKOMETRY MEASUREMENTS OF THE PRIMATE EYE.
Interim rept. for Aug 65,
by Francis A. Young, George A. Leary, and Donald N. Farrer. Feb 66, 32p. Contract PHS-NB-05459-01, ARL TR-66-5

Unclassified report

Descriptors: (*Chimpanzees, Eye), (*Eye, Measurement), Primates, Ophthalmology, Ultrasonic radiation, Humans, Males, Females, Correlation techniques, Tables

Results obtained on 160 eyes of 53 male and 40 female chimpanzees ranging in age from 2 to 15 years, using ultrasonography and photographic ophthalmophakometry to measure anterior chamber depth, lens thickness, and axial length, are compared with the results obtained on 140 human eyes of a comparable sex grouping using the same methods. The intercorrelations between methods are not quite as high on the chimpanzees as on the humans, but the correlations between the measures of axial length and the vertical ocular refraction are virtually identical for the two groups. Either ultrasound or photographic ophthalmophakometry may be used successfully on primates and will yield results which compare favorably with those obtained on humans, but ultrasound is the method of choice since it does not require as much time to make the measurement or to calculate the result as does phakometry. Further, it does not require the rigid degree of control over the animal's behavior that phakometry requires and its flexibility allows measurement in situations in which it would be impossible to obtain phakometry measurements. Thus for both human and animal work, ultrasound is generally superior to phakometry. (Author)

AD-629 095 Fld. 6/3
BRUSSELS UNIV (BELGIUM) LAB OF PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM
FUNCTIONAL PROPERTIES OF THE EFFERENT COCHLEAR BUNDLE OF THE PIGEON REVEALED BY STEREOTAXIC STIMULATION,
by J. E. Desmedt, and P. J. Delwaide. 23 Jun 64, 29p. Contract AF-EOAR-43-64 ,PHS-NB-02482
AFOSR 65-2527

Unclassified report

Availability: Published in Experimental Neurology v11 n1 p1-26 Jan 1965. Copies to DDC users only.

Descriptors: (*Pigeons, Ear), Stimulation, Brain, Auditory nerve, Behavior, Nerve impulses, Hearing, Surgical techniques, Spinal cord, Excision, Belgium

The function of the efferent cochlear bundle (ECB) has been studied in over a hundred pigeons with the spinal cord transected at C2-C3, local anesthesia and muscle paralysis. The excellent biological status of the animals was carefully assessed throughout the experiments, which frequently lasted several hours. Electrical responses evoked by click or tone pip were picked up chiefly at the exposed round-window membrane. Bipolar needles were inserted stereotaxically into the brain stem with the ECB as target (histological controls). Repetitive electrical stimulation of the ECB before delivery of the testing sound potentiates markeely the cochlear microphonic receptor potential of the hair cells and inhibits simultaneously the auditory nerve response. This dual effect results in a reduction of acoustic input to the brain. These and other observations suggest that the ECB of the bird is homologous functionally to the olivocochlear bundle of mammals. Important quantitative differences have nevertheless, been found. The potency of the efferent inhibition is much smaller in the pigeon than it is in the cat, which raises the question of its behavioral significance in the former species. The potentiation of the cochlear microphonic component is relatively more prominent in the pigeon and it dissipates more slowly than the simultaneously recorded inhibition of the neurals. Such different kinetics might be related to the peculiar synaptic organization of the bird's inner ear. (Author)

AD-629 099 Fld. 6/3
NAVAL MEDICAL RESEARCH UNIT NO 2 TAIPEI (TAIWAN)
ZOOPHILIC SCHISTOSOMIASIS WITH A REPORT OF A NEW LOCALITY ON TAIWAN.
Technical rept.,
by Robert E. Kuntz. 25 May 65, 14p. Rept. no. 27 ,NAMRU-2-TR-226
Contract PHS-HE-03834-0751,
NAVMED MF022.03.07-2003-27

Unclassified report

Availability: Published in Journal of the Formosan Medical Association, v64 n10 p649-57 Oct 28 965. Copies to DDC users only.

Descriptors: (*Schistosoma, Taiwan), (*Disease vectors, Schistosoma), (*Gastropoda, Disease vectors), Diseases, Integumentary diseases, Antigens + antibodies, Ecology, Distribution, Epidemiology, Parasitic diseases

A four and a half year multiphase study has indicated that the distribution of the snail host Oncomelania formosana for Schistosoma japonicum is greater than previously recorded for Taiwan. In addition, snails from this new area were susceptible to the 'human' strain of S. japonicum originating from the Philippines and Japan. This is in contrast to previous reports. Extensive surveys of intestinal parasites of man based on stool examinations of the inhabitants of Taiwan and its Offshore Islands failed to incriminate Taiwan as a source of human infection by S. japonicum. Cercarial dermatitis with associated sensitivity to intradermal skin testing with S. japonicum antigen occurred in a few of the indigenous people in the enzootic area. (Author)

AD-629 166 Fld. 6/3
CFSTI Prices: HC $10.40 MF $2.75
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
TREMATODES OF ANIMALS AND MAN (FUNDAMENTALS OF TREMATODOLOGY, VOLUME 20),
by K. I. Skryabin. 22 Oct 65, 740p. Rept. no. FTD-TT-65-393,
TT 66-60696

Unclassified report

Unedited rough draft trans. of mono. Trematody Zhivotnykh i Cheloveka (Osnovy Trematodologii, v20), Moscow, 1962 563p. See also TT-64-11055.

Descriptors: (*Trematodes, Biology), Morphology (Biology), USSR

AD-629 296 Fld. 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
THE CENTRES FOR TOUCH DISCRIMINATION IN OCTOPUS,
by J. Z. Young. 21 Jul 64, 35p. Contract AF-EOAR-2-63, Proj. AF-9777, Task 977701,
AFOSR 65-2509

Unclassified report

Availability: Published in Phil. Trans. Royal Society of London v249 n755 (SerB) p45-67 May 1965. Copies to DDC users only.

Descriptors: (*Cephalopoda, Nervous system), (*Sensory perception, Cephalopoda), Touch, Reflexes, Morphology (Biology), Anatomy, Nerve fibers, Nerve cells, Visual per-

ception, Learning, Memory, Embryology, Great Britain

The inferior frontal system, concerned with learning chemotactile discriminations, shows four distinct regions. The posterior buccal lobes contain both large and small cells and are the centre of the system. They receive fibres from the arms (without interweaving), from the lips, and from the buccal mass. They send fibres downwards to the arm centres and backwards to the opic and superior frontal/vertical systems. This is therefore probably both a reflex centre for response to some simple chemotactile stimuli and also the main output pathway for the whole system. In the lateral inferior frontal lobes the fibres from the arms interweave and mix with those from other sources. Their efferent fibres pass to the posterior buccal lobes and to the same destinations as the efferent fibres of the posterior buccal lobes. The organization of the lateral inferior frontal thus allows responses to combinations of chemotactile inputs. The medial inferior frontal lobe receives the same input as the lateral inferior frontals, and its interweaving bundles allow for further spreading and combination between afferents. Its efferent axons pass only to the subfrontal lobes. The subfrontal lobes, besides the input from the median inferior frontal lobe, receive fibres from below. Their cells are mostly very small, with axons ending within the lobe. A few larger cells with axons running to the posterior buccal lobes carry the output. (Author)

AD-629 297 Fld. 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
THE BUCCAL NERVOUS SYSTEM OF OCTOPUS,
by J. Z. Young. 21 Jul 64, 26p. Contract AF-EOAR-2-63, Proj. 9777, Task 977701, AFOSR 65-2513

Unclassified report

Availability: Published in Phil. Trans. Royal Society of London v249 n755 (SerB) p27-44 May 1965. Copies to DDC users only.

Descriptors: (*Cephalopoda, Nervous system), Digestive system, Anatomy, Poisons, Nerve fibers, Ganglia, Salivary glands, Brain, Autonomic nervous system, Great Britain

The operations of killing and eating food by an octopus are under the control of a series of nervous centres. The poison centre lies most posteriorly and is probably activated first, since it lies close to endings of fibres from the arms. The fibres of the nerves to the posterior salivary gland run without synapse from the superior buccal lobe to the glands, passing first far forward and then back along the duct. There is thus no peripheral synapse on this path, perhaps because no continuing rhythmic operations are involved in the secretion, and no reflex guidance is needed. The actual injection of the poison by the salivary papilla is controlled through the subradular ganglia. The cerebro-subradular connectives arise from the front of the superior buccal ganglia, near the entrance of the labial nerves qqd run direct to the subradular ganglia, bypassing the inferior buccal ganglion. The interbuccal connectives also arise from the front of the superior buccal lobe and run to the inferior buccal ganglion. The inferior buccal ganglion sends nerves to the muscles of the jaws and radula and to the anterior salivary glands, buccal palps and oesophagus. Through the sympathetic nerve it communicates with the gastric ganglion. The inferior buccal ganglion has a complicated internal structure. From its outer surface arise numerous strands of the juxta-ganglionic tissue, which end at the surfaces of the buccal sinus. The proportion of large cells decreases in the sequence posterior buccal, superior buccal, inferior buccal, subradular and gastric ganglia. (Author)

AD-629 299 Fld. 6/3
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
FURTHER OBSERVATIONS ON FORCES EXERTED BY OCTOPUS VULGARIS,
by Noel Dilly, and Marion Nixon. 2 Nov 64, 9p. Contract AF-EOAR-42-64, Proj. AF-9777, Task 977701, AFOSR 65-2526

Unclassified report

Availability: Published in Pubbl. Staz. Zool. Napoli v34 p340-5 1965. Copies to DDC users only.

Descriptors: (*Cephalopoda, Strength), Body weight, Force (Mechanics), Measurement

Octopuses kept isolated in tanks with heavy lids, for learning and other experiments, may escape, especially when recently arrived in the aquarium (Taki, 1941; Boycott, 1954; Dilly, Nixon and Packard, 1964). During training experiments octopuses can sometimes be seen to move the building bricks of their home. A further impression of the force they are capable of exerting is appreciated when an octopus is placed in a straight sided jar with a wooden lid for induction with urethane anaesthetic solution. Two observations of the pushing force of small animals (Dilly, Nixon and Packard, 1964) suggested that this was approximately half of the pulling force of animals of similar weight. Experiments were undertaken to measure the pushing force and to find whether there is any relationship between this and the body weight. These observations should be of help in assessing the minimum precautions necessary to prevent the loss of animals from tanks and experimental apparatus. (Author)

AD-629 374 Fld. 6/3, 6/13
CFSTI Prices: HC $1.00 MF $0.50
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
CURRENT REFERENCES IN MEDICAL ENTOMOLOGY FROM RUSSIAN, CENTRAL AND EASTERN EUROPEAN AND CHINESE LITERATURE, VOLUME 5, NO. 2,
by George Anastos. 1966, 14p. Contract DA-49-193-MD-2238, TT 66-60709

Unclassified report

Descriptors: (*Disease vectors, Indexes), (*Insects, Disease vectors), Ticks, Diptera, Mites, Siphonaptera, Pest control, Bacteria, Spirochaeta, Diseases, Protozoa, Rickettsia, Virus diseases, USSR, Eastern Europe, China

AD-629 401 Fld. 6/3, 6/6, 8/6
MCGILL UNIV MONTREAL (QUEBEC) DEPT OF GEOGRAPHY
ON TERMITARIA IN A SAVANNA ECOSYSTEM BRITISH GUIANA.
Savanna research series, (Technical rept),
by R. J. A. Goodland. 29 Jan 65, 12p. Rept. no. SRS-2,TR-2
Contract Nonr-3855 (00) Proj. NR-387-029,

Unclassified report

Availability: Published in Canadian Journal of Zoology v43 p641-50 1965. Copies to DDC users only.

Descriptors: (*British Guiana, Isoptera), (*Isoptera, British Guiana), (*Ecology, British Guiana), Geography, Biology

During the course of a quantitative phytosociological analysis of the vegetation of the Northern Rupununi Savanna, British Guiana, the termitera were measured by the Quarter Method of the Wisconsin School in a manner similar to that for trees. The ecological distribution of the termitaria was found to be correlated with quantitative expressions of the vegetation and the environmental factors. The termites impoverish the surrounding soils by concentrating soil nutrients into their termitaria. They reduce the plant cover and decrease the water-retaining capacity of the soils. Termites are shown to be an integral part of the savanna ecosystem. Termites may aid the growth of woody plants by improving the drainage and allowing the growth of the roots of phreatophytes through a hard pan. Termitaria, termites, and their effects on the soil and the vegetation are briefly discussed in general. Also presented are a chart of the savanna ecosystem and an extensive bibliography. (Author)

AD-629 459 Fld. 6/3
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE MORPHOLOGIE ANIMALE
CHLOROPLAST MULTIPLICATION AND GROWTH IN THE UNICELLULAR ALGA ACETABULARIA MEDITERRANEA,
by D. C. Shephard. 24 Feb 64, 18p. Contract AF 61 (052)-356,PHS-GM-6767-02 Proj. AF-9777, Task 977701, AFOSR 65-2245

Unclassified report

Availability: Published in Experimental Cell Research v37 p93-110 1965. Copies to DDC users only.

Descriptors: (*Chloroplasts, Growth), (*Algae, Chloroplasts), Thiols, Cytoplasm, Weight, Morphology (Biology), Nucleic acids, Proteins, Starches, Glycolysis, Streptomycins, Lipoic acids, Belgium

The growth of Acetabularia appears to be exponential. The doubling time for wet weight, chloroplast number and total chloroplast volume is eight to nine days--an appropriate value for the whole of the growth cycle of the plant. There appears to be no change in growth rate at the time of cap formation. The chloroplasts are spherical to elongate with one or more starch bodies. Their volumes range from 0.5 cubic microns to almost 100 cubic microns with a mean of about 8 cubic microns. During the growth of the plant, larger, starch-filled chloroplasts accumulate until cap formation when there is a fall in mean volume. Although no direct evidence for chloroplast division is presented, the results support division as the normal means of chloroplast multiplication in Acetabularia. Maintenance in the dark arrests growth and chloroplast multiplication in the plants. An observed increase in mean chloroplast volume of the dark reared plants may be due to fusion of the chloroplasts. Enucleation slows growth to about one half its normal rate. However, the chloroplasts continue to multiply, indicating that the replication of their nucleic acids, proteins and all other components continues in the absence of the nucleus. (Author)

AD-629 461 Fld. 6/3, 6/1
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE MORPHOLOGIE ANIMALE
GROUPES SULFHYDRILES ET MORPHOGENESE. I. EFFETS DU BETA-MERCAPTOETHANOL, DE L'ACIDE ALPHA-LIPOIQUE, DE L'ACIDE ADENOSINETRIPHOSPHORIQUE ET DE L'OXALOACETATE SUR LE DEVELOPPEMENT EMBRYONNAIRE DES BATRACIENS (SULFHYDRYL GROUP AND MORPHOGENESIS. I. EFFECTS OF BETA-MERCAPTOETHANOL, ALPHA-LIPIOC ACID, ATP, AND OXALOACETATE ON EMBRYONIC DEVELOPMENT IN AMPHIBIANS),
by J. Brachet. 29 Oct 62, 20p. Contract AF 61 (052)-356, Proj. AF-9777, Task 977701, AFOSR 65-2244

Unclassified report

Text in French.

Availability: Published in Developmental Biology v7 p348-64 Mar 1963. Copies to DDC users only.

Descriptors: (*Thiols, Embryology), (*Embryology, Amphibians), Morphology (Biology), Lipoic acids, Adenosine phosphates, Oxalacetic acid, Embryos, Belgium

The effects of mercaptoethanol, lipoic acid, ATP and oxaloacetate, alone or in combination, have been studied in eggs of 4 different species of amphibians. The effects of mercaptoethanol (M/100)

and lipoic acid (20-30 micrograms/ml) are remarkably similar: cleavage is little affected, but gastrulation and neural plate closure are strongly inhibited. At lower concentrations, outgrowth of the tail is strongly reduced. Mercaptoethanol and lipoic acid, if mixed together, have additive effects. ATP, which speeds up neural plate closure, is antagonistic to both mercaptoethanol and lipoic acid so far as neurulation is concerned. It has no effect on the outgrowth of the tail. Oxaloacetate, like other tricarboxylic cycle intemediates, has unfavorable effects on neural tube closure. It often improves the elongation of the tail in lipoic acid-treated embryos. (Author)

AD-629 462 Fld. 6/3, 6/1
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE MORPHOLOGIE ANIMALE
EFFETS DE L (ACIDE ALPHA-LIPOIQUE SUR LE METABOLISME DES ACIDES NUCLEIQUES CHEZ LES EMBRYONS DE BATRACIENS ET DE POULET (EFFECTS OF ALPHA-LIPOIC ACID ON NUCLEIC ACID METABOLISM IN AMPHIBIAN AND CHICKEN EMBRYOS),
by V. Heilporn-Pohl, and J. Quertier. 10 Dec 63, 20p. Contract AF 61 (052)-356, Proj. AF-9777, Task 977701,
AFOSR 65-2243
Unclassified report

Text in French.

Availability: Published in Developmental Biology v9 p155-75 1964. Copies to DDC users only.

Descriptors: (*Lipoic acids, Embryology), (*Nucleic acids, Metabolism), (*Embryology, Nucleic acids), Chickens, Amphibians, Thiols, Embryos, Tritiated compounds, Deoxyribonucleic acids, Ribonucleic acids, Thymidines, Nucleosides, Nucleotides, Ribose, Pyridines, Organic phosphorus compounds, Oxidation, Reduction (Chemistry), Glycols, Autoradiography, Belgium

Both the oxidized and the reduced forms of lipoic acid inhibit neural tube closure in pleurodeles and in chicken embryos. Oxidized lipoic acid inhibits the incorporation of H3-uridine and H3-cytidine into DNA; it inhibits the stage which involves the reduction of the ribonucleosides to the deoxyribonucleosides: in fact, the incorporation of H3-deoxyuridine is little or not all affected by this substance. The action of reduced lipoic acid and reduced triphosphopyridine nucleotide on the reduction of ribose to deoxyribose is just the opposite of that exerted by oxidized lipoic acid. The addition of TPNH to oxidized lipoic acid prevents the inhibition of the incorporation of the ribonucleosides normally observed with oxidized lipoic acid. (Author)

AD-629 667 Fld. 6/3, 15/2
CFSTI Prices: HC $5.60 MF $0.75
MILITARY RESEARCH AND DEVELOPMENT CENTER BANGKOK (THAILAND)
VEGETATION ANALYSIS OF PRAN BURI DEFOLIATION TEST AREA 1,
by Amnuay Kaosingha, and John W. Kelley. Jan 66, 60p. Rept. no. 66-007,
Unclassified report

Descriptors: (*Trees, Thailand), (*Defoliants, Environmental tests), Plants (Botany), Distribution, Periodic variations, Morphology (Biology), Sprays

The vegetation of the defoliation test site 1 at Pran Buri was described and inventoried so that data would be available for precise evaluation of the effects of defoliant spraying. The site is in a Dry or Semievergreen forest. Vegetation was divided into categories according to physiologic characteristics: dominant species, intermediate species, shrubs and climbers, and ground cover. Of the 164 species found in the area, 46 were dominant, 35 were intermediate, 64 were shrubs and climbers, and 19 were ground cover. All species belong to 117 genera from 52 families. Formation percentage for each category was determined by counting stems of trails in each of the 83 test plots and was determined by counting stems of each species found in a 30-ft strip 530 ft along the trails. The formation percentages were found to be 17 percent for dominant, 75 percent intermediate, and 8 percent for shrubs and climbers. Ground cover was excluded from the stem count, as it would be a virtually impossible task on that scale of test areas and would probably contribute little to the evaluation. The formation percentages according to phenology were found to be 16 percent deciduous, 82 percent evergreen, and 2 percent uncertain. (Author)

AD-629 107 **See Fld. 12/1**

AD-629 110 **See Fld. 6/19**

6/4. BIONICS

AD-629 368 Fld. 6/4, 5/2, 9/2
CFSTI Prices: HC $5.60 MF $0.50
SYSTEM DEVELOPMENT CORP SANTA MONICA CALIF
UPDATING OF THESAUR PROGRAM.
Technical memo.,
by Sally Yeates Sedelow, and Terry Ruggles. 17 Dec 65, 53p. Rept. no. tm-1908/009/00,
Contract Nonr-4427 (00) Proj. NR-348-005,
Unclassified report

Descriptors: (*Language, Analysis), (*Programming (Computers), Language), (*Information retrieval, Programming (Computers)), Pattern recognition

This document updates the description of THESAUR, the third section of the stylistic analysis program contained in TM-1908/100/00, 'Stylistic Analysis: Report on the First Year of Research,' 1 March 1965. The revised THESAURincorporates changes designed for better retrieval of concept continuities as well as for more adequate display of both continuities and discontinuities. One of the major changes has been the introduction of SUFFIX, the root-finding section of the program, into THESAUR. This new use of SUFFIX enlarges considerably the number of words retrieved; searches in THESAUR had previously been word specific. One change in the output is retention of linking words (primary words which also occur as associated words), even though they do not occur in the section of text under examination (this fact is indicated through a comment). Changes also include a clear indication of the initial appearance of a given word with a particular word grouping, and a number of other features which make the output more readable and informative. (Author)

AD-628 926 **See Fld. 5/1**

6/5. CLINICAL MEDICINE

AD-628 892 Fld. 6/5, 7/4
CFSTI Prices: HC $1.60 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
OXYGEN CONCENTRATION, TEMPERATURE, AND VISCOSITY DETERMINATIONS: POLAROGRAPHIC TECHNIC.
Final rept. for Jun-Oct 65,
by Edward A. Rice, and Robert E. Vopat. Dec 65, 13p. Rept. no. SAM-TR-65-89,
Proj. AF-5710, Task 571003,
Unclassified report

Descriptors: (*Polarographic analysis, Oxygen), (*Oxygen, Physical properties), Density, Temperature, Viscosity, Measurement

A technic was developed for determining the effects of ionizing radiation on molecular oxygen concentration in an aqueous solution. The polarographic principle was used for determining oxygen concentation, temperature, and viscosity of solution, and oxygen concentration in gas. The polarographic system has the following principal characteristics: (1) parameters can be remotely measured, permitting the system to be used in environments hostile to observers (i.e., radiation); (2) temperature measurement can be made within 1C.; (3) changes in temperature are recorded instantly; (4) oxygen concentration can be measured with a resolution well within 1 mm. Hg; and (5) oxygen changes are recorded instantly. (Author)

AD-628 964 Fld. 6/5, 5/5
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
UPPER EXTREMITY PROSTHETICS RESEARCH. HUMAN TRACKING. SENSORY MOTOR CONTROL. MYOELECTRIC CONTROL.
Biotechnology Lab. progress rept.,
by John Lyman. 15 Jan 66, 22p. Rept. no. 66-9, Contract N123 (60530)32857A ,AF 33 (615)-1969
Unclassified report

Also sponsored by contract V1005p-9779 and Grant VRA-RD-1201M-64.

Descriptors: (*Prosthetics, Medical research), (*Artificial limbs, Control systems), (*Tracking, Performance (Human)), Electrophysiology, Electronic equipment, Human engineering, Motor reactions, Arms, Hands, Muscles, Pneumatic devices, Surgery, Transducers

AD-629 017 Fld. 6/5
CFSTI Prices: HC $7.60 MF $0.75
CALIFORNIA UNIV BERKELEY
THE INFLUENCE OF ORGANIZATIONAL FACTORS UPON PSYCHIATRIC CARE IN THE UNITED STATES ARMY.
Master's thesis,
by Dorothy Earley Weitzman. 1965, 79p. Contract DA-49-193-MD-2396,
Unclassified report

Thesis submitted to Wisconsin Univ., Madison.

Descriptors: (*Psychiatry, Army personnel), (*Army personnel, Military medicine), (*Military organizations, Psychiatry), United States, Medical personnel

The study concerns psychiatric labelling as a response to deviance in the United States Army. The research dealt with the treatment given trainees by an army psychiatric clinic. The main purpose of the research was to examine relationships between attributes of the army organization and the labelling behavior of psychiatric staff within that organization.

AD-629 177 Fld. 6/5
CALIFORNIA UNIV LOS ANGELES SCHOOL OF MEDICINE
CHRONIC EFFECTS OF REVASCULARIZING THE ISCHEMIC HYPERTENSIVE KIDNEY UTILIZING A SEGMENT OF ILEUM,
by Y. J. Katz, A. T. K. Cockett, and R. S. Moore. 29 Sep 64, 9p. Contract AF-AFOSR-246-63, PHS-HE-08100-01
AFOSR 65-2851
Unclassified report

Availability: Published in Investigative Urology v2 n6 p515-22 May 1965. Copies to DDC users only.

Descriptors: (*Kidneys, Hypertension), Surgical techniques, Blood vessels, Blood circulation, Contraction, Arteries, Blood pressure, Kidney function tests, Intestines, Transplantation, Dogs

Chronic renal function studies and blood pressure determinations were conducted over a 2- to 5-year period in ten animals made hypertensive by signifi-

cant renal artery constriction. Unilateral ileac revascularization of a solitary kidney or bilateral revascularization was performed. Hypertension was not affected by ileac revascularization. Renal blood flow, however, returned toward normal baseline levels after the ileac segment was attached. (Author)

AD-629 313 Fld. 6/5, 5/2
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C GEOGRAPHIC PATHOLOGY DIV
A REPORT ON THE AMERICAN REGISTRY OF GEOGRAPHIC PATHOLOGY,
by Howard C. Hopps. 1966, 4p.
Unclassified report

Availability: Published in International Pathology p20-3 Jan 1966. Copies to DDC users only.

Descriptors: (*Pathology, Statistical data), Geography, Distribution, Classification, Diseases, Information retrieval, Scientific organizations

AD-629 340 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
CUTANEOUS FOCAL MUCINOSIS,
by Waine C. Johnson, and Elson B. Helwig. 1 Sep 65, 8p. Contract PHS-2A-5289,
Unclassified report

Presented at the Annual Meeting of the American Medical Association (114th), New York, 22 Jun 65.

Availability: Published in Archives of Dermatology v93 p13-20 Jan 1966. Copies to DDC users only.

Descriptors: (*Skin, Mucopolysaccharides), (*Mucin, Integumentary diseases), Pathology, Neoplasms, Biopsy, Histological techniques, Connective tissue, Collagen, Diagnosis, Therapy, Excision, Etiology

A study of 14 patients with focal mucinosis revealed the usual clinical features-asolitary, asymptomatic, flesh -colored to white papule or nodule. The pathologic changes consisted of fibroblastic proliferation in the corium, an increased production of hyaluronic acid by these fibroblasts and an associated decrease or absence of reticulum and collagen formation. Hyaluronic acid accumulates between the collagen fibers, eventually replaces most of the collagen, and occasionally results in formation of small cystic spaces. The pathogenesis of focal mucinosis is similar to that of myxoid cysts of the fingers and toes, and minor variations may be related to the anatomical differences of the involved sites. Similarities to and differences from other cutaneous mucinoses and myxomas are discussed. The lesions did not recur after simple surgical excision, and this appears to be the treatment of choice. (Author)

AD-629 342 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
NEW CONCEPTS IN PATHOLOGY OF THE CORNEA,
by Lorenz E. Zimmerman. 1965, 20p. Contract NIH-NB-5379,
Unclassified report

Availability: Published in The Cornea World Congress p30-48 1965. Copies to DDC users only.

Descriptors: (*Cornea, Pathology), Diseases, Secretion, Nerves, Organic pigments, Neoplasms, Cancer, Histology, Membranes (Biology), Ophthalmology

Aspects of corneal pathology discussed are: (1) hypersecretion of basement membrane material by the corneal epithelium; (2) proliferation of corneal nerves; (3) granulomatous reactions to Descemet's membrane; (4) certain pigmentations of the cornea; and (5) neoplasms of the cornea.

AD-629 344 Fld. 6/5, 6/13
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C GEOGRAPHIC PATHOLOGY DIV
MYCOBACTERIUM ULCERANS INFECTION (WITH COMMENTS ON PATHOGENESIS),
by Daniel H. Connor, and H. Fletcher Lunn. 1965, 12p. Contract DA-MD-49-193-63-G101,
Unclassified report

Availability: Published in Proceedings LWM-AFIP Conf Internat. J. Leprosy 33, n3 p52 p698-709 1965. Copies to DDC users only.

Descriptors: (*Mycobacterium, Infections), Ulcers, Diseases, Necrosis, Pathology, Diagnosis, Chemotherapy, Biopsy, Excision, Healing, Histological techniques, Tissues (Biology), Toxins + antitoxins, Edema, Epidemiology, Subsoharan Africa

Mycobacterial ulceration is a severe disease affecting a large number of people living along the Nile in Uganda. In a histopathologic study of 38 cases of M. ulcerans infection, we observed one case in the preulcerative state. The lesion consisted of a central nidus of mycobacterial colonies surrounded by a wide zone of necrotic tissue. The implications of these findings have been discussed and the suggestion made that M. ulcerans elaborates a diffusible toxin that causes tissue necrosis. (Author)

AD-629 345 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
ULTRASTRUCTURAL ALTERATIONS IN RAT LUNGS. CHANGES AFTER INTRATRACHEAL PERFUSION WITH FRESHWATER AND SEAWATER,
by Howard E. Reidbord, and Werner U. Spitz. 14 Oct 65, 10p. Contract PHS-GM-12014-01
Unclassified report

Availability: Published in Arch Path, v81 p103-11 Feb 1966. Copies to DDC users only.

Descriptors: (*Lungs, Drowni g), (*Drowning, Pathology), Morphology (Biology), Water, Sea water, Respiratory system, Osmosis, Mitochondria, Hypoxia, Histology, Electron microscopy, Rats

Seawater and freshwater were perfused into the respiratory tract of rats, and the ultrastructural architecture of the lung was examined. A clear difference was found between the freshwater, saltwater, and control groups. The changes in freshwater pulmonary flooding appeared to be predominantly osmotic in nature, as indicated by severe cellular disruption, mitochondrial swelling, and endothelial destruction. In seawater perfusion, the lung structure was well preserved, although formation of vacuoles, discontinuity of alveolar lining cells, and swelling of cells were noted. These findings were felt to represent the morphologic alterations resulting from the movements of large quantities of fluid across the alveolar-capillary region in addition to osmotic and hypoxic effects. The clinical, chemical, and physiologic differences between freshwater and saltwater drowning appear to be reflected in the ultrastructural morphology. (Author)

AD-629 355 Fld. 6/5, 6/14
CFSTI Prices: HC $5.00 MF $1.00
OFFICE OF THE SURGEON GENERAL AIR FORCE WASHINGTON D C
ANNUAL REPORT OF THE USAF MEDICAL SERVICE (11TH), 1 JULY 1963-30 JUNE 1964.
1964, 155p.
Unclassified report

Descriptors: (*Military medicine, Air Force), Aviation personnel, Medical personnel, Officer personnel, Education, Classification, Hospitals, Management engineering, Aviation medicine, Manpower studies, Costs, Drugs, Biometry, Diseases, Hemosporidia, Space medicine, Flight surgeons, Tobacco, Allergy, Public health, Industrial medicine, Dentistry, Veterinary medicine, Mortality rates, Tables

Contents: Major activities: Medical staffing and education; hospitalization; professional services; dental services; veterinary services; tables; charts. Biostatistics: Summary; workload; medical care; morbidity; permanent manpower losses; tables: strengths; indexes of health and medical workload; use of facilities; medical care; morbidity; deaths; special topics.

AD-629 406 Fld. 6/5
NAVAL MEDICAL RESEARCH UNIT NO 2 TAIPEI (TAIWAN) DEPT OF BIOCHEMISTRY
HEMOGLOBIN J KORAT IN THAIS.
Technical rept.,
by R. Quentin Blackwell, Li-Chin Chien, BoonnamBlackwell, Jeanette T. H. Huang, and Arkom Samaharn. 7 Sep 65, 6p. Rept. no. NAMRU-2-TR-227,
NAVMED MF022.03.07-2004.14
Unclassified report

Availability: Published in Science v150 n3703 p1614-5 17 Dec 1965. Copies to DDC users only.

Descriptors: (*Hemoglobin, Anomalies), (*Blood diseases, Thailand), Adults, Taiwan

Hemoglobin J Korat, a 'fast' hemoglobin with an anomaly in its beta chain different from the anomalies previously reported, was the major hemoglobin component in the blood of nine subjects among 1923 Thais from northeastern Thailand. After hemoglobin E, J Korat is the second most frequent of the anomalous hemoglobins among Thais. (Author)

AD-629 418 Fld. 6/5, 6/8
ILLINOIS UNIV CHICAGO COLL OF MEDICINE
HISTOPATHOLOGY OF MICE FED IRRADIATED FOODS,
by Samuel W. Thompson,II, Ronald D. Hunt, John Ferrell, Edward D. Jenkins, and Harry Monsen. 10 Feb 65, 12p. Contract DA-49-007-MD-794, Proj. DA-3A012501A-803,
Unclassified report

Prepared in cooperation with Fitzsimons General Hospital, Denver Colo.

Availability: Published in The Journal of Nutrition v87 n3 p274-84 Nov 1965. Copies to DDC users only.

Descriptors: (*Irradiated foods, Pathology), Diet, Ingestion (Physiology), Nutrition, Tissues (Biology), Heart, Neoplasms, Histological techniques, Etiology, Statistical analysis, Mice

A total in excess of 4000 mice of the Cb and Strong A strains were fed a composite diet composed of pork loin, whole boned chicken, evaporated milk, blanched carrots and white potatoes, which was 100% irradiated, the same diet non-irradiated, a similar diet in which only one component was irradiated, or a commercial pellet diet. Representative groups of mice were killed at periodic intervals after receiving the diet for from zero to 600 days, and tissue sections were prepared from specimens of all organs and tissues which were fixed in formalin at the time of necropsy. The fixed heart of each mouse was serially sectioned and mounted on film strips. All tissue sections and film strip mounts were examined by bright field microscopy. Cardiac auricular dilation and rupture reported to have been produced in these strains of mice, by the irradiated diets used, were not observed in any mouse in any diet group of this

study. Extensive statistical evaluation of all lesions observed in the various phases of this study indicated that no lesion occured with significantly increased frequency in the irradiated diet groups. (Author)

AD-629 738 Fld. 6/5
CFSTI Prices: HC $1.60 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
PROTECTIVE PERFORMANCE OF STANNOUS FLUORIDE-ZIRCONIUM SILICATE PROPHYLAXIS PASTES.
Final rept. Mar-Jun 63,
by Ira L. Shannon. Feb 66, 11p. Rept. no. SAM-TR-66-7,
Task 775303,
Unclassified report

Descriptors: (*Teeth, Protective treatments), Fluorides, Tin compounds, Zirconium compounds, Silicates, Dentistry, Abrasives, Stability, Toilet articles, Mixtures, Effectiveness

Laboratory studies established that freshly prepared zirconium silicate-stannous fluoride prophylaxis pastes were highly effective in protecting human enamel from acid decalcification. While these pastes did not maintain peak protective potency when aged over the 8-week experimental period, there was an indication of stability in the more concentrated pastes for the first 4 days. Further study will clarify the nature of this apparent short-term maintenance and subsequent loss of effectiveness. The operator who wishes to employ zirconium silicate as a paste abrasive can be assured that, in a fresh mix with stannous fluoride solution, a high degree of protection is provided the enamel surface. (Author)

AD-629 741 Fld. 6/5
CFSTI Prices: HC $1.60 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
GLUCOSE TOLERANCE RESPONSES IN YOUNG ADULTS OF SHARPLY CONTRASTING PERIODONTAL STATUS.
Final rept. Feb 63-Apr 64,
by Ira L. Shannon, Timothy J. O'Leary, William A. Gibson, and Robert L. Jenson. Feb 66, 13p. Rept. no. SAM-TR-66-9,
Task 775303,
Unclassified report

Descriptors: (*Dentistry, Toxic tolerances), (*Teeth, Diseases), Glucose, Diagnosis, Mouth, Carbohydrates, Metabolism, Statistical analysis

Conventional oral glucose tolerance tests were performed for 100 systemically healthy young adult males. Half of these subjects were classified as being relatively free of periodontal involvement (GPI = 1.60), while the other half presented evidence of loss of alveolar support and, in general, could be classified as requiring periodontal treatment (GPI = 3.15). Statistical analyses sought differences in glucose responses between the two groups at all sampling intervals. No significant differences were found. These results confirm previous observations from this laboratory that glucose tolerance testing cannot be employed as an index of susceptibility to periodontal involvement in this age group. (Author)

AD-629 067 **See Fld. 6/19**

AD-629 164 **See Fld. 5/9**

AD-629 314 **See Fld. 6/20**

AD-629 730 **See Fld. 6/16**

6/6. ENVIRONMENTAL BIOLOGY

AD-629 348 Fld. 6/6
CFSTI Prices: HC $1.00 MF $0.50
ARCTIC AEROMEDICAL LAB FORT WAINWRIGHT ALASKA
INFRARED THERMOGRAPHY OF SUBJECTS IN DIVERSE ENVIRONMENTS.
Technical rept.,
by James H. Veghte. Dec 65, 18p. Rept. no. AAL-TR-65-18,
Proj. AF-8238, Task 823801,
Unclassified report

Descriptors: (*Body temperature, Measurement), (*Surface temperatures, Body), Radiometers, Infrared equipment, Environment, Skin, Densitometers, Temperature sensitive elements

Infrared thermograms were made with a scanning radiometer of 15 nude subjects exposed to environments of 4 and 23C for two hours and sweating subjects exposed to an environment of 27C for 10 minutes. Surface temperatures of 41 different body areas were determined by relating calculated temperature values for a gray scale on each thermogram with densitometer readings. Surface temperatures were found to be more variable in the cold, 8 to 15C, with an average mean temperature of 11C. The nose, pectoral area, patella, gluteus maximus and fatty tissue about the waist were cold regions whereas the upper chest, forehead and spinal column were warm regions. In a comfortable environment, the subjects' surface temperatures were less variable, 25 to 29C. Surface temperatures of subjects in comfort environments show similar differences between identical body regions as seen in the cold, but the magnitude of the temperature gradients was less. Sweating subjects had uniform surface temperatures, mean 33C, with only small variations. These data were used to compare various methods for determining mean skin temperatures. (Author)

AD-629 392 Fld. 6/6
BRITISH COLUMBIA RESEARCH COUNCIL VANCOUVER
FAR INFRARED SPECTRA OF MOSQUITO REPELLENTS,
by H. B. Rayner, and R. H. Wright. 16 Mar 65, 6p. Contract DA-49-193-MD-2391,
Unclassified report

Availability: Published in The Canadian Entomologist v98 n1 p76-80 Jan 1966. Copies to DDC users only.

Descriptors: (*Culicidae, Insect repellants), (*Insect repellants, Infrared spectroscopy), Canada, Absorption spectrum

Mosquito-repellent chemicals tend to absorb far infrared radiation (below 600/cm.) more strongly than do non-repellents of comparable molecular weight. The correlation is probably less direct than was previously supposed, and is hardly strong enough to be used as a primary screening technique. (Author)

AD-629 003 **See Fld. 6/20**

AD-629 401 **See Fld. 6/3**

AD-629 402 **See Fld. 8/6**

6/7. ESCAPE, RESCUE AND SURVIVAL

AD-628 897 Fld. 6/7, 6/16, 6/8
CFSTI Prices: HC $1.60 MF $0.50
HAWAII UNIV HONOLULU PACIFIC BIOMEDICAL RESEARCH CENTER
AMELIORATIVE MEASURES IN FASTING, SUBARCTIC SURVIVAL SITUATIONS.
Progress rept. 1 Jan-1 Jun 64,
by Terence A. Rogers, James A. Setliff, and Alan C. Buck. Nov 65, 12p. Contract AF 41 (609)-1918, Proj. AF-8238, Task 823803,
AAL TR-65-10
Unclassified report

Descriptors: (*Military rations, Arctic regions), (*Survival, Arctic regions), (*Diet, Survival), Starvation, Dehydration, Electrolytes (Physiology), Sucrose, Metabolism

The experiment was undertaken to explore practicable measures that might minimize dehydration and other metabolic derangements in a fasting, arctic survival situation. Twenty-eight men, divided into four groups, were fed a standard diet of USAF IF No. 10 rations in barracks for two days, then subjected to a three-day simulated survival situation, followed by two days of standard diet in barracks. Group A received no supplements, Group B received an electrolyte supplement administered as 150 mEq NaCl the first day and 150 mEq NaHCO3 the next two days, Group C 500 kcal as sucrose, and Group D 500 kcal as sucrose plus electrolyte as in B. Results suggest that a survival ration could, with benefit, comprise 500 kcal/day of carbohydrate supplemented with a sodium salt, as this combination ameliorates dehydration, hypoglycemia and ketonuria ordinarily associated with a survival situation. Provision of sodium as bicarbonate did not appear to be of any advantage. (Author)

AD-628 898 Fld. 6/7, 6/16, 6/8
CFSTI Prices: HC $1.60 MF $0.50
HAWAII UNIV HONOLULU PACIFIC BIOMEDICAL RESEARCH CENTER
A COMPARISON, UNDER ARCTIC SURVIVAL CONDITIONS, OF A PEMMICAN-TYPE MEAT BAR WITH AN ISOCALORIC RATION OF SUCROSE PLUS ELECTROLYTES.
Progress rept. 1 Jan-1 Jun 64,
by Terrence A. Rogers. Nov 65, 16p. Contract AF 41 (609)-1918, Proj. AF-8238, Task 823803,
AAL TR-65-11
Unclassified report

Descriptors: (*Military rations, Arctic regions), (*Survival, Arctic regions), (*Diet, Survival), (*Meat, Nutrition), Metabolism, Starvation, Electrolytes (Physiology), Sucrose, Sodium compounds, Dehydrated foods

The basis of current arctic survival ration is 'pemmican' or a meat bar composed of powdered lean meat mixed with fat. The present experiment compares, under survival conditions, metabolic changes in men fasting completely, men receiving sucrose and electrolyte supplements, and men receiving the meat bar. Eighteen men divided into three groups of six men each, ate a standard diet of USAF IF No. 10 rations in barracks for two days, then underwent a seven-day simulated survival situation. Isocaloric intake of pemmican at this level did not appear to have any great advantage over simple starvation, whereas sucrose with a sodium salt supplement prevented or ameliorated some of the symptoms of starvation. It was concluded that although the caloric density and high protein content of pemmican are advantageous to fully-fed men, pemmican is inferior to sucrose plus sodium salts for severly limited calorie regime. (Author)

AD-629 347 Fld. 6/7
CFSTI Prices: HC $1.60 MF $0.50
ARCTIC AEROMEDICAL LAB FORT WAINWRIGHT ALASKA
CNU-1/P SUSTENANCE KIT MODIFICATION (T-33).
Technical rept., Nov 64-Oct 65,
by John R. Schumann. Nov 65, 18p. Rept. no. AAL-TR-65-22,
Proj. AF-8238, Task 823802,
Unclassified report

Descriptors: (*Survival kits, Design), Alaska, Pilots, Protective clothing, Exposure, Survival, Human engineering, Tests, Packaging

The project was established to provide adequate cold-weather survival protection for T-33 pilots who utilize the seat-pack parachute. Pilots in this category had not previously been so equipped.

After extensive evaluation and operational testing, the Alaskan Air Command approved modification of CNU-1/P for use with the seat-pack parachute in the T-33 jet aircraft. The kit is now in use during the period October through May. In addition to basic survival items, the kit contains a down-filled coat, SRU-6P; mittens, SRU-10P; and half bag or foot sack, SRU-12P. The problem of bulk reduction was solved by tufting, using manual pressure and upholstering methods. Packaging of the down-filled clothing into the CNU-1/P kit can be done by local Personal Equipment Technicians with a small expenditure of man-hours and materials. (Author)

6/8. FOOD

AD-629 219 Fld. 6/8
CFSTI Prices: HC $4.00 MF $1.00
MELPAR INC FALLS CHURCH VA
INTERRELATIONSHIPS BETWEEN STORAGE STABILITY AND MOISTURE SORPTION PROPERTIES OF DEHYDRATED FOODS.
Final rept. 27 Mar 64-26 Mar 65, (Phase 1),
by J. H. Chandet. 26 Mar 65, 121p. Contract DA-19-129-AMC-252 (N) Proj. DA-1K-012501A034,
Unclassified report

Descriptors: (*Dehydrated foods, Storage), (*Sorption, Dehydrated foods), Moisture, Temperature, Stability, Water vapor, Fruits, Eggs, Beef, Potatoes, Cereals, Milk, Crustacea, Laboratory equipment, Tables

The report describes the following work: (1) The measurement of moisture sorption isotherms of the dried food powders, banana, egg yolk, beef, shrimp, white potato, apple, sweet potato, rice, and milk; (2) the calculation of moisture monolayer values, total number of sorption sites, and heats of sorption; and (3) the chemical evaluation of storage stability of these nine foods stored at 37.8C. at five different moisture levels which were below, at, and above the moisture monolayer value. (Author)

AD-629 316 Fld. 6/8, 6/18
ARMY MEDICAL RESEARCH AND NUTRITION LAB DENVER COLO
DATA ON WHOLESOMENESS STUDIES, A PROGRESS REPORT,
by Nicholas Raica Jr.. 1965, 6p.
Unclassified report

Availability: Published in Radiation Preservation of Foods p185-90 1965. Copies to DDC users only.

Descriptors: (*Irradiated foods, Acceptability), Preservation, Diet, Nutrition, Growth, Reproduction (Physiology), Hemoatology, Pathology, Life span, Toxicity, Histology, Radioactivity, Dogs, Rats, Monkeys, Mice

While the process of preserving foods by ionizing radiations is still in its infancy and problems remain to be solved, irradiated foods have been found to be as wholesome and, in general, as acceptable as nonirradiated foods. The progress report presents the broader aspects of the wholesomeness program which has led us to these conclusions.

AD-628 897 **See Fld. 6/7**

AD-628 898 **See Fld. 6/7**

AD-629 418 **See Fld. 6/5**

6/11. LIFE SUPPORT

AD-629 622 Fld. 6/11, 13/2
CFSTI Prices: HC $7.00 MF $1.50
AEROJET-GENERAL CORP DAYTON OHIO
PROCEEDINGS OF THE CONFERENCE ON ATMOSPHERIC CONTAMINATION IN CONFINED SPACES, 30 MARCH-1 APRIL 1965,
Dec 65, 324p. Contract AF 33 (657)-11305, Proj. AF-6302,
AMRL TR-65-230
Unclassified report

Descriptors: (*Air pollution, Symposia), (*Closed ecological systems, Air pollution), Space medicine, Confined environments, Spacecraft cabins, Submarines, Life support, Toxicity, Contamination, Hazards, Respiration, Exposure, Oxygen, Pressure breathing, Histology, Space simulation chambers, Laboratory animals, Chemical analysis, Tolerances (Physiology), Statistical analysis

The report is a complete compilation of the papers presented and the proceedings of the Conference on Atmospheric Contamination in Confined Spaces, sponsored by the Aerospace Medical Research Laboratories and held in Dayton, Ohio on 30, 31 March and 1 April 1965. Major technical areas discussed by the invited speakers, panel members and Conference attendees included continuous inhalation exposure techniques, statistical methods for evaluation and interpretation of exposure data, minimum criteria for continuous exposure studies and toxicological qualification of space cabin materials. The Conference participants were provided the opportunity to tour the Toxic Hazards Research Unit at Wright-Patterson Air Force Base and to ask questions regarding its operation. A discussion of the Clean Air Act of 1963 was presented by a representative of the Federal Department of Health, Education and Welfare. (Author)

6/12. MEDICAL AND HOSPITAL EQUIPMENT AND SUPPLIES

AD-629 101 **See Fld. 14/3**

6/13. MICROBIOLOGY

AD-629 003 **See Fld. 6/20**

AD-629 344 **See Fld. 6/5**

AD-629 374 **See Fld. 6/3**

6/14. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-629 355 **See Fld. 6/5**

6/15. PHARMACOLOGY

AD-629 054 Fld. 6/15
BUENOS AIRES UNIV (ARGENTINA) INSTITUTO DE ANATOMIA GENERAL Y EMBRIOLOGIA
ACTION OF RESERPINE, IPRONIAZID AND PYROGALLOL ON NERVE ENDINGS OF THE PINEAL GLAND,
by Amanda Pellegrino de Iraldi, and Eduardo de Robertis. 2 Jun 63, 14p. Contract AF-AFOSR-62-333,
AFOSR 65-2746
Unclassified report

Availability: Published in International Journal of Neuropharmacology, v2 p231-9 1963. Copies to DDC users only.

Descriptors: (*Endocrine glands, Autonomic nervous system), (*Amines, Endocrine glands), (*Reserpine, Endocrine glands), (*Isoniazid, Endocrine glands), (*Phenols, Endocrine glands), Psychotropic agents, Rats, Enzyme inhibitors, Argentina

Drugs that may change the metabolism of catecholamines and indolamines have been used in order to investigate the nature of the granulated vesicles found in adrenergic nerve endings in the pineal gland of the rat. In normal endings, 30-40 per cent of the vesicles are granulated and the rest are homogeneous. The proportion of granulaed vesicles diminish considerably between 2-48 hr after a single injection of reserpine and this is slowly restored to normal levels in a period of 8 days. A single injection or chronic treatment with iproniazid (a MAO inhibitor) increases the proportion of granulated vesicles, and also the size of the vesicles and granules. Iproniazid prior to reserpine protects the nerve endings from the depletion of granulated vesicles. Pyrogallol (a COMT inhibitor) does not change the concentration of granuated vesicles and does not protect the nerve ending from the action of reserpine. These results are interpreted as supporting the concept that the granulated vesicles contain the adrenergic transmitter. The possible mechanism of action of these drugs on the submicroscopic structure of adrenergic nerve endings is discussed. (Author)

AD-629 076 Fld. 6/15
CFSTI Prices: HC $2.60 MF $0.50
AEROMEDICAL RESEARCH LAB (6571ST) HOLLOMAN AFB N MEX
ISONIAZID THERAPY IN THE CHIMPANZEE.
Interim technical rept., Dec 64-Dec 65,
by J. Fineg, W. C. Hanly, J. R. Prine, D. C. Van Riperand , and P. W. Day. Jan 66, 22p. Rept. no. ARL-TR-66-1,
Proj. ARL-6892,
Unclassified report

Descriptors: (*Isoniazid, Mycobacterium tuberculosis), (*Mycobacterium tuberculosis, Chemotherapeutic agents), Diseases, Therapy, Chimpanzees, Toxicity, Dosage

Three chimpanzees were diagnosed as having pulmonary tuberculosis (diagnosis based upon PPD test and chest X-rays). Two of the animals were necropsied and diagnosis confirmed. The remaining TB positive chimpanzee was housed with three chimpanzees which had shown a negative reaction to the tuberculin test. All subjects were put on an initial dose of 10 mg/kg body weight of isoniazid per day. The following experiment, consisting of four major objectives, was designed: (1) to evaluate the use of isonicotinic acid hydrazide (INH) as a single agent against tuberculosis, (2) to determine the effective therapeutic and/or prophylactic dose and level of INH, (3) to determine the rate of inactivation of INH in the chimpanzee, and (4) to determine the toxic level of INH in the chimpanzee. The single TB positive chimpanzee remained on 10 mg/kg body weight of INH per day while the others were given varying doses to determine toxicity levels and inactivation times. The experiment ran 1 year during which time all subjects were TB tested (PPD, KOT, intrapalpebral) and chest X-rays were taken monthly. At the end of the time period, all subjects were subjected to necropsy to verify findings. (Author)

AD-629 216 Fld. 6/15
LYON UNIV (FRANCE)
EFFETS DE RESERPINE, DOPA ET 5 HTP SUR LES DEUX ETATS DE SOMMEIL (EFFECTS OF RESERPINE, DOPA AND 5 HTP ON THE TWO STATES OF SLEEP),
by J. Matsumoto, and M. Jouvet. 1964, 6p. Contract AF-EOAR-62-67,
AFOSR 65-2673
Unclassified report

Text in French; Attached Summary in English.

Availability: Published in Comptes Rendus des Seances de la Societe de Biologie, v158 n11 p2137-40 16 Nov 1964. Copies to DDC users only.

Descriptors: (*Reserpine, Sleep), (*Serotonin, Sleep), Amino acids, Cerebral cortex, Amines, France

Reserpine in dose 0.5 mg/kg causes a diminution of slow sleep and a total disappearance of paradox-

ical sleep with a slower return to normal in four days. Reserpine followed by 5 HTP does not affect slow sleep but paradoxical sleed is abolished or reduced for three days. Reserpine followed by DOPA suppressed paradoxical sleep more strongly, with a return to normal the next day. It seems that variations in cerebral catecholamine may effect paradoxical sleep. (Author)

AD-629 411 Fld. 6/15
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MEDICINE IMPROVES THE STATE OF MIND,
by I. Lapin. 20 Jan 66, 10p. Rept. no. FTD-TT-65-1368,
TT 66-60717

Unclassified report

Unedited rough draft trans. from Meditsinskaya Gazeta, (USSR) 27 Aug p3 1965.

Descriptors: (*Psychotropic agents, Psychiatry), Pharmacology, Toxicity, Emotions, Enzyme inhibitors, Tranquilizers, Reserpine, USSR

AD-629 548 Fld. 6/15
CFSTI Prices: HC $2.00 MF $0.50
BOSTON UNIV MASS HYPOTHERMIA LAB
ANTIARRHYTHMIC ACTIVITY OF ANTAZOLINE AND ITS APPLICATION TO THE CONTROL OF HYPOTHERMIC VENTRICULAR FIBRILLATION.
Final rept. Feb 63-Apr 65,
by E. T. Angelakos. Dec 65, 37p. Contract AF 33 (657)-10755, Proj. AF-7222,AF-7164 Task 722204,716409
AMRL TR-65-201

Unclassified report

Descriptors: (*Hypothermia, Arrhythmia), (*Arrhythmia, Antihistaminics), Heart, Pathology, Pharmacology, Dosage

The chemistry and general pharmacology of antazoline and experimental studies employing it are reviewed to determine the antiarrhythmic activity and the protective effect of antazoline against hypothermic ventricular fibriliation. In hypothermic ventricular fibrillation and in clinically observed heart disorders, the antiarrhythmic activity of antazoline was often superior to other pharmacological agents, including quinidine. The incidence of side effects, notably nausea or vomiting, was found to be related to the dosage. Since the basis of the antiarrhythmic activity of antazoline is essentially unknown, further studies in this direction are warranted to provide for systematic development of more effective compounds. (Author)

AD-629 563 Fld. 6/15
FLORIDA UNIV GAINESVILLE
AN ELECTROENCEPHALOGRAPHIC STUDY OF THE EFFECTS OF MEPROBAMATE ON HUMAN SLEEP,
by Frank R. Freemon, Harman W. Agnew,Jr., and Robert L. Williams. 21 Oct 64, 8p. Contract AF-AFOSR-62-13,
AFOSR 65-2680

Unclassified report

Availability: Published in Clinical Pharmacology and Therapeutics v6 n2 p172-6 Mar-Apr 1965. Copies to DDC users only.

Descriptors: (*Tranquilizers, Sleep), (*Sleep, (*Electroencephalography, Tranquilizers), Dosage, Barbiturates, Alcohols, Humans

The effect of meprobamate on human sleep and dreaming was assessed in a double-blind, placebo-controlled study by means of all-night electroencephalography. On nights when meprobamate was ingested in a dose of 400mg. at 9:00 p.m. and 800 mg. at 12:00 a.m., normal subjects spent significantly less time in sleep accompanied by low-voltage fast EEG than when receiving placebo. The time spent in rapid eye movement periods, which are related to visual dreaming, was decreased by meprobamate. This study shows that meprohamate characteristically alters the amount of time spent in each sleep stage and significantly decreases inferred visual dreaming Comparisons are made between the changes in the human electroencephalogram during sleep produced by meprobamate and those produced by the barbiturates. (Author)

AD-629 211 **See Fld. 6/16**

AD-629 221 **See Fld. 6/16**

AD-629 311 **See Fld. 6/18**

6/16. PHYSIOLOGY

AD-628 899 Fld. 6/16, 6/1
CFSTI Prices: HC $3.00 MF $0.50
GOTEBORG UNIV (SWEDEN) DEPT OF HISTOLOGY
RESEARCH ON INTRA NEURONAL MECHANISMS FOR INFORMATION STORAGE.
Technical rept.,
by Holger Hyden. 31 Mar 65, 52p. Rept. no. TR-1,
Contract AF-EOAR-28-63, Proj. AF-9777, Task 977701,
AFOSR 66-0364

Unclassified report

Descriptors: (*Histology, Nerve cells), (*Nerve cells, Ribonucleic acids), (*Ribonucleic acids, Learning), Behavior, Proteins, Desoxyribonucleic acids, Adenine, Synthesis, Nervous system diseases, Paralysis, Rhythm (Biology), Ganglia, Nervous system, Physiology, Central nervous system, Cytochemistry, Brain, Ribosomes, Rats, Sweden

Different types of micro-chemical methods used for analysis of neurons and glia are discussed. As an introduction to a discussion of a biochemical response in neuron and glia during learning, a few basic problems are mentioned and some pertinent results are given. The neurons are especially rich in RNA and during a life-cycle in man, there can be discerned a rise, steady level and fall in the RNA content of moto-neurons. What this cycle of changes means from a functional point of view, seems to be an important problem to consider for future studies. During sleep-wakefulness, rhythmic enzyme changes were recorded alternating between the neurons and glia in the caudal part of the reticular formation in rabbits. These changes are taken to reflect circadian, rhythmic processes underlying the biological clock phenomenon. During physiological stimulation of the nervous system in mammals, an increase of the RNA content, total proteins and enzyme activities have been found in the neurons, and a decrease in the surrounding glia. To elucidate this phenomenon, a kinetic study and other experiments were carried out. The results showed that the neuron and its glia are coupled as a unit from an energetic point of view. Some RNA data from a study of Parkinson's disease are given to show that one part of the unit can influence the other from a biochemical as well as from a functional point of view. (Author)

AD-628 948 Fld. 6/16
NAVAL MEDICAL RESEARCH INST BETHESDA MD
DETERMINATION OF HUMAN BODY VOLUME FROM HEIGHT AND WEIGHT.
Interim rept.,
by Julius Sendroy,Jr., and Harold A. Collison. 29 Jun 65, 8p.
NAVMED MR005.02-0011.01-10

Unclassified report

Availability: Published in Journal of Applied Physiology, v21 n1 p167-72 Jan 1966. Copies to DDC users only.

Descriptors: (*Body, Volume), Body weight, Anthropometry, Humans, Males, Females, Infants, Adults, Life span, Surface area, Lipids, Equations, Statistical analysis

A previously developed method of graphical determination of human body volume from measurements of height and weight has been extended for utilization from a limited range to one spanning the development of male and female form from infant to adult. A statistical evaluation and comparison with results of almost 1900 physical measurements taken from the literature indicate that this approach provides results acceptable for most clinical purposes, and is much more convenient and rapid than other, conventional methods of arriving at indices of body composition (volume, specific gravity, density, and body fat). The method permits the simultaneous determination of human body surface area as previously described. (Author)

AD-628 963 Fld. 6/16
ARMY MEDICAL RESEARCH AND NUTRITION LAB DENVER COLO
INFLUENCE OF PERIODICITY OF EATING ON ADIPOSE TISSUE METABOLISM IN THE RAT,
by G. A. Leveille, and R. W. Hanson. 19 Apr 65, 12p.

Unclassified report

Availability: Published in Canadian Journal of Physiology and Pharmacology v43 p857-68 1965. Copies to DDC users only.

Descriptors: (*Ingestion (Physiology), Adipose tissue), (*Adipose tissue, Metabolism), (*Carbohydrates, Metabolism), (*Lipids, Metabolism), Glucose, Saccharide phosphates, Coenzymes, Enzymes, Biosynthesis, Rats

The effects of meal eating (a single 2-hour meal per day) on carbohydrate and lipid metabolism were studied in rats. Food consumption was greater in rats fed ad libitum (nibblers); however, the rate of gain was similar for both groups after an initial weight loss for the meal eaters. Isolated adipose tissue from meal eaters converted more glucose to CO2, fatty acids, nonsaponifiable lipids, and glycogen than did tissue from nibbling animals. Acetate incorporation into fatty acids was also higher in adipose tissue from meal eaters. A higher level of pentose phosphate pathway activity in adipose tissue was indicated for meal-eating rats. Refeeding for up to 2 hours after a 22-hour fast resulted in increased lipogenesis in adipose tissue from meal eaters. Total oxidized pyridine nucleotide coenzyme (NAD-NADP) levels and the rate of glucose oxidation to CO2 in rat epididymal fat pads were found to decrease during the first 30 minutes of refeeding in meal eaters. Changes noted in metabolic pattern induced by refeeding were apparently not due to de novo enzyme synthesis. The significance of the adaptive changes noted is discussed. (Author)

AD-629 078 Fld. 6/16
CFSTI Prices: HC $2.00 MF $0.50
AEROMEDICAL RESEARCH LAB (6571ST) HOLLOMAN AFB N MEX
AN INVESTIGATION OF VISION DURING INVOLUNTARY SACCADIC EYE MOVEMENTS.
Master's thesis,
by Robert W. Ebbers. Feb 66, 42p. Rept. no. ARL-TR-66-4,

Unclassified report

Descriptors: (*Vision, Reflexes), (*Eye, Motion), Autonomic nervous system, Thresholds (Physiology), Intensity, Retina

The purpose of the investigation reported here was to determine whether or not vision is present during involuntary saccades. The results indicate that vision is present, though impaired, during the involuntary saccades. Evidence is also presented which indicates that an intensity threshold factor

is involved. Further, it is strongly suggested that the visual impairment is due to a blue or smear of the retinal image.

AD-629 092 Fld. 6/16
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET .D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
INHIBITION OF NONSPECIFIC SENSORY ACTIVITIES FOLLOWING STRIOPALLIDAL AND CAPSULAR STIMULATION,
by G. Krauthamer, and Denise Albe-Fessard. 22 Jul 64, 27p. Contract AF-EOAR-13-63 ,PHS-NB-04795-01
AFOSR 65-2852

Unclassified report

Availability: Published in J. Neurophysiol, v28 p100-24 1965. Copies to DDC users only.

Descriptors: (*Central nervous system, Electrophysiology), Inhibition, Stimulation, Brain, Ganglia, Neuromuscular transmission, Nervous system, Physiology, Chloralose, Strychnos alkaloids, Cats, France

In cats under chloralose anesthesia, the nonspecific peripherally evoked responses of the anterior marginal and middle suprasylvian gyrus were inhibited following stimulation of the basal ganglia. The inhibition was bilateral and limited to the nonspecific sensory potentials evoked by peripheral stimuli. Primary somatic, visual, and auditory potentials were not inhibited. The inhibition was not associated with any cortical activity of striatal origin and the results of cortical ablation experiments indicate a subcortical locus of inhibition. The parameters of the inhibitory stimulation were studied. The effective stimulus usually consisted of a brief volley (25 msec.), though single shocks were found to be effective for some electrode placements. Mapping of the basal ganglia showed the inhibitory points to be concentrated in the dorsolateral aspect of the head of the caudate nucleus, the dorsal globus pallidus, and the entopeduncular nucleus. Stimulation of the medial caudate nucleus, putamen, and claustrum was ineffective. Other inhibitory zones were located in the internal capsule; they were spatially distinct from other capsular regions which were either silent or excitatory. The possible significance of this distribution of inhibitory zones is discussed. The inhibition extended over 150-350 msec. Its onset was gradual, building up to a maximum 30-50 msec. after striatal stimulation. (Author)

AD-629 093 Fld. 6/16, 5/10
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
ELECTROPHYSIOLOGIC STUDIES OF THE BASAL GANGLIA AND STRIOPALLIDAL INHIBITION OF NON-SPECIFIC AFFERENT ACTIVITY,
by G. M. Krauthamer, and Denise Albe-Fessard. 20 Jan 64, 24p. Contract AF-EOAR-13-63, PHS-NB-04795-01
AFOSR 65-2832

Unclassified report

Availability: Published in Neuropsychologia v2 p73-83 1964. Copies to DDC users only.

Descriptors: (*Electrophysiology, Central nervous system), (*Behavior, Electrophysiology), Ganglia, Brain, Inhibion, Stimulation, Sense organs, Motor reactions, Nerve cells, Nerve fibers, Chloralose, Cats, France

Anatomical and behavioral data are summarized to show that the function of the basal ganglia extends beyond a simple control of motor activity. A summary is given of the neurophysiological data showing that: (a) The basal ganglia are integrative centers (structures with convergence properties, receiving messages from peripheral sense organs as well as the cortex; and (b) Stimulation of these nuclei (described in the literature) leads to effects outside the efferent motor pathways. In cats anesthetized with chloralose, the stimulation of certain zones in the basal ganglia inhibits the evoked nonspecific sensory activity at different levels (bulb, thalamus, cortex) but leaves intact primary sensory activity. An attempt is made to understand certain experimental and clinical observations in term of the possible role that the described inhibition might play in the normal subject.

AD-629 109 Fld. 6/16
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
LA FREQUENZA DI SCARICA DEI MOTONEURONI SPINALI NELL'ARTO SUPERIORE E INFERIORE DELL'UOMO IN RELAZIONE CON LA TENSIONE SVILUPPATA DAL MUSCOLO,
by T. Gualtierotti, and F. Bracchi. 1959, 4p. Contract AF 61 (052)-23,
AFOSR TN-60-1295

Unclassified report

Presented at Comunicazione all'XI Congresso Nazionale della Societa Ital. di Fisiologia Salsomaggiore 8-10 ottobre 1959.

Availability: Published in Dal Bollettino Della Societa' Italiana di Biologia Sperimentale, v35 n24 p2071-4 1959. Copies to DDC users only.

Descriptors: (*Central nervous system, Electrophysiology), Nerve cells, Muscles, Neuromuscular transmission, Spinal cord, Nerve fibers, Italy

AD-629 171 Fld. 6/16
FLORIDA UNIV GAINESVILLE
THE EFFECTS OF STAGE FOUR SLEEP DEPRIVATION,
by Harman W. Agnew Jr., Wilse B. Webb, and Robert L. Williams. 16 Sep 63, 6p. Contract AF-AFOSR-62-13,
AFOSR 65-2682

Unclassified report

Availability: Published in Electroencephalography and Clinical Neurophysiology v17 p68-70 1964. Copies to DDC users only.

Descriptors: (*Sleep, Electroencephalography), Experimental data

Individuals may be deprived of stage 4 sleep without a deprivation of the quantitative amount of sleep, i.e. they may be 'moved' from stage 4 sleep into other stages of sleep without awakening. The 'movement' of sleep, in this experiment, did not occur consistently into any other stage. Such deprivation of stage 4 sleep results in a significant increase in this type of sleep during a recovery night. These results, particularly the latter, would suggest a requirement for this type of sleep. When comparing our results with the Dement study, we might also describe our findings as suggestive of a psychic need, or propose that 'stage 4 deprivation' results in a requirement for sleep associated with this type EEG activity. We prefer the latter interpretation. (Author)

AD-629 202 Fld. 6/16
LYON UNIV (FRANCE) LABORATOIRE DE PATHOLOGIE EXPERIMENTALE
PARADOXICAL SLEEP-A STUDY OF ITS NATURE AND MECHANISMS,
by M. Jouvet. 1965, 46p. Contract AF-EOAR-62-67,
AFOSR 65-2683

Unclassified report

Availability: Published in Progress in Brain Research v18 p20-62 1965. Copies to DDC users only.

Descriptors: (*Sleep, Physiology), Electroencephalography, Behavior, Brain, Central nervous system, Electrophysiology, Eye, Motion, Vertebrates, Rhythm (Biology), Reflexes, Proprioception, Temperature, Pituitary gland, Thalamus, Blood, Osmosis, Metabolism, Hypothermia, France

The EEG findings and behavioural, phylogenetic, ontogenetic, functional and structural criteria are presented, representing a number of concordant arguments in favour of the duality of the states of sleep and of the autonomy, at least relative, of paradoxical sleep (P.S.) with respect to slow sleep. An attempt is made to delimit certain mechanisms regulating the appearance of P.S.

AD-629 203 Fld. 6/16
LYON UNIV (FRANCE)
ETUDE STATISTIQUE DU CYCLE VEILLE-SOMMEILS CHEZ LE CHAT (STATISTICAL STUDY OF THE SLEEP-WALKING CYCLE IN THE CAT),
by F. Delorme, P. Vimont, and D. Jouvet. 1964, 5p. Contract AF-EOAR-62-67,
AFOSR 65-2671

Unclassified report

Text in French; Attached Summary in English.

Availability: Published in Comptes Rendus des Seances de la Societe de Biologie, v158 n11 p2128-30 16 Nov 1964. Copies to DDC users only.

Descriptors: (*Sleep, Cats), Statistical analysis, Electroencephalography, France

The cat sleeps 68.5% of the time. Behavioral sleep is divided into 77% 'slow' sleep and 23% paradoxical. The average duration of paradoxical sleep is five minutes, 45 plus or minus 80 seconds. (Author)

AD-629 204 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
THE PROPERTIES OF RETICULO-SPINAL NEURONS,
by W. D. Willis, and F. Magni. 1964, 11p. Contract AF-EOAR-62-9, Proj. AF-9777, Task 977701,
AFOSR 65-2847

Unclassified report

Availability: Published in Progress in Brain Research, v12 Physiology of Spinal Neurons (The Netherlands) p56-64 1964. Copies to DDC users only.

Descriptors: (*Nerve cells, Spinal cord), (*Electrophysiology, Nerve cells), Nerve impulses, Stimulation, Brain, Nervous system, Physiology, Italy

Reticulo-spinal neurons are identified by intracellular recording of the antidromic action potentials resulting from stimulation of the spinal cord. The characteristics of their action potentials are described. The axons of reticulo-spinal cells are found to conduct at rates up to 130m/sec and to have relatively low thresholds for electrical stimulation. The axons project as far caudally as S1 and travel in the ventral part of the cord. Reticular neurons with axons projecting both caudally into the cord and rostrally to the midbrain are described. The functional role of the reticulo-spinal neurons studied is discussed. (Author)

AD-629 205 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
SUBCORTICAL AND PERIPHERAL CONTROL OF BRAIN STEM RETICULAR NEURONS,
by F. Magni, and W. D. Willis. 1964, 19p. Contract AF-EOAR-62-9, Proj. AF-9777, Task 977701,
AFOSR 2849

Unclassified report

Availability: Published in Arch. ital. Biol. v102 p434-48 1964. Copies to DDC users only.

Descriptors: (*Nerve cells, Brains), (*Electrophysiology, Nerve cells), Stimulation, Nerve impulses, Neuromuscular transmission, Nerve fibers, Cerebral cortex, Nervous system, Physiology, Italy

Several types of neurons of the brain stem reticular formation are shown to receive postsynaptic potentials from stimulation in the region of the central tegmental tract in the rostral mesencephalon. The transmission of excitatory postsynaptic potentials is monosynaptic. An incidental finding which is reported is the reversal of sign of the after-potential immediately following the spike potential in a reticulospinal neuron as the membrane potential changes. The action of volleys in a cutaneous and a muscular nerve of the forelimb upon reticulospinal neurons was studied. Several combination of postsynaptic potentials could be produced by such volleys. The effects appear to be mediated chiefly by low threshold cutaneous fibers and group II muscle afferent fibers. The interaction of postsynaptic potentials from peripheral nerve and cerebral cortical stimulation is described. The present findings are compared with other work, and some functional implications are discussed. (Author)

AD-629 206 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
CORTICAL CONTROL OF BRAIN STEM RETICULAR NEURONS,
by F. Magni, and W. D. Willis. 1964, 20p. Contract AF-EOAR-62-9, Proj. AF-9777, Task 977701,
AFOSR 65-2850

Unclassified report

Availability: Published in Arch. ital. Biol. v102 p418-33 1964. Copies to DDC users only.

Descriptors: (*Nerve cells, Brain), (*Electrophysiology, Nerve cells), Cerebral cortex, Nerve impulses, Nervous system, Physiology, Spinal cord, Inhibition, Cats, Italy

The effects of corticofugal volleys upon reticular neurons were studied in anaesthetized and pyramidal cats. The reticular neurons were identified by intracellular recording of antidromic action potentials, and they were classified according to the direction of projection of their axons. Most reticulospinal neurons were excited by cortical volleys, as were reticular neurons with axons projecting both rostrally and caudally. Reticular neurons with long ascending axons were, however, only occasionally affected. Inhibitory postsysnaptic potentials were seldom observed and then only following excitatory potentials. There was a widespread convergence of excitatory action from many areas of the cerebral cortex upon individual reticular neurons. The pattern of convergence varied with the particular neuron. The effects from comparable cortical areas on the two sides were generally equivalent. Characteristics of the excitatory postsynaptic potentials are described. Some functional implications of the findings are discussed. (Author)

AD-629 207 Fld. 6/16
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
AFFERENT CONNECTIONS TO RETICULOSPINAL NEURONS,
by F. Magni, and W. D. Willis. 1964, 15p. Contract AF-EOAR-62-9, Proj. AF-9777, Task 977701,
AFOSR 65-2848

Unclassified report

Availability: Published in Progress in Brain Research v12 Physiology of Spinal Neurons p246-58 1964. Copies to DDC users only.

Descriptors: (*Nerve cells, Brain), (*Electrophysiology, nerve cells), Nervous system, Physiology, Spinal cord, Stimulation, Cerebral cortex, Nerve impulses, Cats, Italy

Reticulo-spinal neurons of the cat brain stem have been shown to receive excitatory connections from a wide area of the cerebral cortex. The strength of the connections varies both with the cortical area stimulated and with the particular neuron investigated. The effects of changing stimulus parameters are described. Examples are given of excitatory and inhibitory postsynaptic potentials evoked in reticulo-spinal neurons by stimulation of a pathway traversing the region of the central tegmental tract of the mesencephalon. The action of peripheral nerves of the forelimb upon reticulo-spinal neurons is shown in many cases to be complex. (Author)

AD-629 210 Fld. 6/16
FREIE UNIVERSITAET BERLIN (WEST GERMANY) PHYSIOLOGISCHES INSTITUT
UBER DEN EINFLUB KURZZEITIGER ABKLEMMUNG DER VENA PORTAE AUF DIE DIURESE UND DEN ARTERIELLEN BLUTDRUCK DER WACHEN RATTE (THE EFFECT OF SHORT-TERM OCCLUSION OF THE PORTAL VEIN ON DIURESIS AND ARTERIAL BLOOD PRESSURE IN THE UNANESTHETIZED RAT),
by F. J. Haberich. 1964, 3p. Contract AF-EOAR-65-63, Proj. 9777, Task 977701,
AFOSR 65-2843

Unclassified report

Text in German.

Availability: Published in Archiv fur die gesamte Physiologie v281 1964. Copies to DDC users only.

Descriptors: (*Urine, Secretion), (*Obstruction (Physiology), Veins), Blood pressure, Pituitary hormones, Cannulation, Rats, West

Arterial cannulae were implanted in rats for blood pressure measurements, and inflatable cuffs were implanted around the portal vein. The animals were lightly intoxicated with ether, hydrated, and catheterized. After a short control period the portal vein was occluded for 20-60 seconds. Beginning 30-60 seconds after the onset of occlusion, the blood pressure fell 20-50 mm Hg and remained low for 1-2 minutes. Occlusion for 30 seconds or longer caused diuresis to stop for several minutes (anuric phase) and remain decreased for 20-30 minutes (antidiuretic phase). The diuresis returned to its original level in 30-40 minutes. Occlusion for 20 seconds or less had only a weak anti-diuretic effect. This phenomenon cannot be explained by the short-term fall in the blood pressure. It is probably due to a massive outpouring of ADH, since the blood exhibits strong antidiuretic activity during the decreased diuresis. (Author)

AD-629 211 Fld. 6/16, 6/15
FREIE UNIVERSITAET BERLIN (WEST GERMANY) PHYSIOLOGISCHES INSTITUT
DIE BEEINFLUSSUNG DER BADEDIURESE DURCH ADIURETIN (THE EFFECT OF ADH ON IMMERSION DIURESIS),
by P. Eckert. 1964, 3p. Contract AF-EOAR-63-65,
AFOSR 65-2842

Unclassified report

Text in German.

Availability: Published in Archiv fur die gesamte Physiologie v281 1964. Copies to DDC users only.

Descriptors: (*Urine, Secretion), Pituitary hormones, Inhibition, Humans, West Germany

Immersing human subjects in a neutral-temperature water bath for several hours generally triggers a diuresis accompanie by a considerable increase in water clearance. In order to study the efferent mechanism of this diuresis, four subjects were tested to determine whether and under what circumstances diuresis was inhibited by ADH. The following results were obtained: Immersion diuresis was reduced to original diuretic levels by injections of ADH (0.5-1.0 milli-units/kg), just as a comparable polyuria caused by water-drinking was decreased. In addition continuous ADH infusion (0.25 milli-units/kg/30 min.) completely blocked the onset of immersion diuresis. These results are in agreement with the hypothesis that inhibition of ADH-secretion plays an important part in immersion diuresis. (Author)

AD-629 218 Fld. 6/16
LYON UNIV (FRANCE) DEPT OF EXPERIMENTAL MEDICINE
ETUDE DE LA MOTRICITE OCULAIRE AU COURS DE LA PHASE PARADOXALE DU SOMMEIL CHEZ LE CHAT (STUDY OF EYE MOVEMENT DURING THE PARADOXICAL PHASE OF SLEEP IN THE CAT),
by M. Jeannerod, J. Mouret, and M. Jouvet. 10 Oct 64, 16p. Contract AF-EOAR-62-67, AFOSR 65-2672

Unclassified report

Availability: Published in Electroencephalography and Clinical Neurophysiology v18 p554-66 1965. Copies to DDC users only.

Descriptors: (*Sleep, Physiology), (*Eye, Motion), Cats, France, Reflexes

The rapid eye movements (REM) occurring during the stage of sleep with fast cortical activity, or paradoxical stage of sleep (PP), have been studied by the electro -oculographic method in chronically implanted cats which were either normal or had brain lesions. In the normal cat, during the PP, the eye movements are either isolated, in small groups (like during visual observation) or in bursts (more than 5 movements); these bursts are specific to the PP. The speed of isolated movements during sleep is slightly slower than that of isolated movements during visual observation. Results suggest that an oculomotor system, triggered by the pons, is responsible for the eye movements during sleep. A schematic organization of such a system is proposed. (Author)

AD-629 221 Fld. 6/16, 6/15
GOTEBORG UNIV (SWEDEN) DEPT OF PHARMACOLOGY
IDENTIFICATION AND CELLULAR LOCALIZATION OF THE CATECHOLAMINES IN THE RETINA AND THE CHOROID OF THE RABBIT,
by Jan Haggendal, and Torbjorn Malmfors. 4 Sep 64, 12p. Contract AF-EOAR-30-64 ,PHS-NB-02854-04
AFOSR 65-2521

Unclassified report

Availability: Published in Acta Physiol. Scand. v64 p58-66 1965. Copies to DDC users only.

Descriptors: (*Retina, Amines), Histological techniques, Fluorescence, Eye, Autonomic nervous system, Nerve cells, Amino acids, Levarterenol, Sweden

By means of fluorescence microscopical and chemical methods the catecholamines of retinas and choroids were examined in rabbits normally, after treatment with drugs interfering with catecholamine storage, and after bilateral cervical sympathectomy. Dopamine was found to be the dominating catecholamine in the retina, 0.1-0.2 micrograms per g. It was localized to particular neurons. The results support the view that dopamine serves as the transmittor of these neurons. Noradrenaline was found in the choroid, 0.2-0.3 micrograms per g. It was localized to adrenergic vascular nerves. (Author)

AD-629 279 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
REGISTRAZIONE MICROELETTRODICA DI RISPOSTE LENTE IMPTALAMICHE EVOCATE

DA STIMOLI SENSITIVI (MICROELECTRODE RECORDING OF SLOW HYPOTHALAMIC EVOKED RESPONSES TO SENSORY STIMULI),
by G. Carli, A. Malliani, and P. Rudomin. 14 May 64, 5p. Contract AF 61 (052)-253, Proj. AF-9777 Task 977701,
AFOSR 65-2744

Unclassified report

Title in English. Text in Italian.

Availability: Published in Dal Bollettino Della Societa' Italiana di Biologia Sperimentale v40 n16 p983-4. Copies to DDC users only.

Descriptors: (*Thalamus, Electrophysiology), Brain, Stimulation, Response, Nerves, Nuclei (Biology), Nervous system, Physiology, Sensory perception, Visual signals, Auditory signals, Morphology (Biology), Cats, Italy

Previous work by the authors with macroelectrodes had shown that evoked diencephalic responses recorded with a monopolar system differed from those recorded with bipolar electrodes: monopolar recording revealed uniform activity throughout most of the nuclei of the thalamus, hypothalamus, and subthalamus, and even in 'non-somatic' structures such as the optic chiasma, while the bipolar system yielded responses that were selectively localized and often exhibited polarity inversions. In the current work tungsten microelectrodes were used to record diencephalic evoked responses in intact cats under local anesthesia and gallamine immobilization. The radial nerves were stimulated with single supermaximal impulses, and light flashes and short clicks were used to stimulate the optic and acoustic afferent systems. The morphology of the evoked responses were generally uniform, consisting of a single negative wave with a latency of about 20-30 msec, except for the posterior and lateral hypothalamus, where the negative wave was preceded by a small positive one and a consequently shorter latent period (about 10 msec). (Author)

AD-629 280 Fld. 6/16
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
CONTRIBUTION OF LOCAL ACTIVITY AND ELECTRIC SPREAD TO SOMATICALLY EVOKED POTENTIALS IN DIFFERENT AREAS OF THE HYPOTHALAMUS,
by A. Malliani, P. Rudomin, and A. Zanchetti. 1965, 20p. Contract AF 61 (052)-253,
AFOSR 65-2241

Unclassified report

Availability: Published in Archives Italiennes de Biologie v103 n1 p119-35 1965. Copies to DDC users only.

Descriptors: (*Thalamus, Electrophysiology), Nerves, Sensory perception, Electrolysis, Test methods, Stimulation, Nervous system, Physiology, Cats, Italy

The contribution of local activity and electric spread to somatically evoked potentials in different areas of the hypothalamus has been assessed by observing whether potentials monopolarly and bipolarly recorded therefrom were influenced by local lesions around the tip of the electrode, according to what could be expected for either local or remote activity in line with the volume conductor theory. Whenever the recording probe, either a macro-or a micro-electrode was in lateral and posterior regions of the hypothalamus and in the subthalamus, local lesions changed all monopolarly recorded responses into purely positive deflections, irrespective of the fact that, before the lesion, the evoked potentials were purely negative or positive-negative in configuration. The responses led bipolarly between the tips of a coaxial probe were completely abolished whenever the lesion involved both leads of the probe. When the recording electrode, either a macro- or a microelectrode, was in the anterior hypothalamus and in the preoptic region, even a large local lesion could never change polarity, shape or amplitude of the evoked potential. Careful control experiments showed that local electrolysis did not change recording conditions.

AD-629 559 Fld. 6/16
UNIVERSIDAD CATOLICA DE CHILE SANTIAGO LABORATORIO DE FISIOLOGIA
VASOPRESSOR AND OXYTOCIC ACTIVITIES IN HUMAN HYPOTHALAMUS, POSTERIOR AND ANTERIOR LOBES OF THE PITUITARY GLAND,
by L. Barnafi, and H. Croxatto. 1 Jun 64, 11p. Contract AF-AFOSR-61-58, Proj. AF-9777, Task 977701,
AFOSR 65-2845

Unclassified report

Availability: Published in Acta Endocrinologica v48 n2 p177-85 1965. Copies to DDC users only.

Descriptors: (*Vasoactive agents, Thalamus), (*Pituitary hormones, Thalamus), (*Pituitary gland, Pathology), Diagnosis, Sex, Males, Females, Chile

The distribution and individual variation of vasopressor and oxytocic activities in the hypothalamus, posterior and anterior lobe of the pituitary gland of 13 women and 15 men were studied. The results showed great individual variation of vasopressor and oxytocic activities in the posterior and anterior lobes, whereas in the hypothalamus a relatively constant hormonal activity was found. No significant sex differences were noted with respect to the content of the vasopressor and oxytocic activities in the hypothalamus and posterior lobe. In the anterior lobe of the female, a higher vasopressor activity was found than in males. No relationship could be established between the distribution of these activities and the pathological condition preceding death. (Author)

AD-629 560 Fld. 6/16
JOHNS HOPKINS UNIV BALTIMORE MD SCHOOL OF MEDICINE
DISTRIBUTION OF CORPUS CALLOSUM AND ANTERIOR COMMISSURE IN CAT AND RACCOON,
by Ford F. Ebner, and Ronald E. Myers. 1963, 15p. Contract AF-AFOSR-61-38 ,PHS-NB-05178
AFOSR 65-2743

Unclassified report

Availability: Published in The Journal of Comparative Neurology v124 n3 p353-65 Jun 1965. Copies to DDC users only.

Descriptors: (*Nerve fibers, Cerebral cortex), Nerves, Brain, Sensory mechanisms, Degradation, Extremeties, Cats, Mammals, Nervous system, Physiology

The distribution of the forebrain commissures was studied using the Nauta-Gygax silver technique. Following total forebrain commissure transaction in the cat the striate cortex or visual area I was remarkably free of degenerating fibers, while peristriate or visual area II showed dense degeneration. Somatic sensory arm and distal hindlimb areas appeared degeneration free while proximal leg and fae areas revealed heavy degeneration. The somatic motor area of the anterior sigmoid gyrus contained dense numbers of degenerating fibers. The auditory areas of ectosylvian gyrus showed moderate degeneration over their entire surface except the most ventrally situated cortical areas which were degenerated free. Fibers from the corpus callosum also terminated in the dorsolateral portions of the head of the caudate nucleus. The anterior limb of anterior commissure distributed mainly to the inner granular layer of the olfactory bulb. In addition, it disseminated considerable numbers of fibers in the anterior olfactory nucleus. The accessory olfactory bulb was degeneration free. The distribution of the forebrain commissures in the raccoon was very similar to the cat. The outstanding feature of the commissural pattern in the raccoon was the total absence of degenerating fibers in the lobular complex relating to the digits of the forepaw. (Author)

AD-629 561 Fld. 6/16
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
ANALYSIS OF PRENATAL SPINALLLLIS ANALYSIS OF PRENATAL SPINAL REFLEX ACTIVITY IN SHEEP,
by L. Anggard, R. Bergstrom, and C. G. Bernhard. 28 Apr 61, 10p. Contract AF 61 (052)-21, AFOSR 65-1571

Unclassified report

Availability: Published in Acta physiol. scand. v53 p128-36 1961. Copies to DDC users only.

Descriptors: (*Embryos, Mammals), (*Muscles, Embryos), (*Electrophysiology, Muscles), Reflexes, Spinal cord, Skin, Stimulation, Inhibition, Nervous system, Physiology, Electrocardiography

An electrophysiological analysis was made of the prenatal development of the reflex muscular response to stretch in 17 non-anaesthetized sheep fetuses (calculated gestational age 53--132 days) kept in placental contact with the decerebrate ewe. Electrical muscle activity recorded with needle electrodes in the gastrocnemius muscle in response to stretch of the muscle appeared around the 60th day and was shown to be of reflex order. Antagonistic inhibition and inhibition evoked by skin stimulation were not found until later on, there being a short period in which no signs of central inhibition were obtained. Decerebrate rigidity was not obtained until the end of the gestation period, the total length of which is about 150 days in sheep. (Author)

AD-629 589 Fld. 6/16
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AVIATION MEDICAL ACCELERATION LAB
FLASHBLINDNESS: THE EFFECTS OF PREFLASH ADAPTATION AND PUPIL SIZE,
by J. H. Hill, and Gloria T. Chisum. 30 Jun 65, 20p. Rept. no. NADC-ML-6508,
Task RAE-13J-012/2021/R005-01-01,

Unclassified report

Descriptors: (*Flashblindness, Adaptation (Physiology)), Eye, Vision, Illumination, Light, Sensitivity, Nuclear weapons, Analysis of variance

A question of considerable operational importance is the extent to which the blinding effect of a flash from a nuclear weapon will vary with the ambient light level. Under conditions of darkness, the size of the pupil and the sensitivity of the eye are maximized. With an increase in the ambient light level both the sensitivity of the eye and the pupil size decrease. Data are presented on the independent effects of pupil size and receptor adaptation level on the production of flashblindness by high intensity, short-duration flashes. (Author)

AD-629 599 Fld. 6/16
WESTERN RESERVE UNIV CLEVELAND OHIO DEPT OF PHYSIOLOGY
RELEASE OF VASOPRESSIN FROM ISOLATED GUINEA PIG POSTERIOR PITUITARIES,
by E. W. Haller, H. Sachs, N. Sperelakis, and L. Share. 18 Jan 65, 7p. Contract AF-AFOSR-408-63, PHS-HE-06035-02
AFOSR 65-2853

Unclassified report

Availability: Published in The American Journal of Physiology v209 n1 p79-83 Jul 1965. Copies to DDC users only.

Descriptors: (*Pituitary hormones, Secretion), Pituitary gland, Thalamus, Stimulation, Barium, Ions, In vitro analysis, Local anesthetics, Guinea pigs

Isolated guinea pig posterior pituitaries, incubated in a modified Krebs-Ringer solution at 37 C, released vasopressin at a relatively constant basal rate. Electrical stimulation at a voltage gradient of 3-9 v/cm (200 msec pulses of 60 cycles/sec ac every 2 sec) resulted in an elevation of vasopressin output. Stimulation at lower field strengths was not effective and maximal vasopressin release was produced by stimulation at any voltage gradient between 3 and 9 v/cm. Vasopressin secretion was augmented at rest and during electrical stimulation by the presence of 2 mM Ba (++) in the incubation medium (increase of Ca (++) by 2 mM had no effect). Tetracaine (0.5 mM) blocked the response to electrical stimulation. Chemical, biological, and enzymic tests indicated that the pressor material secreted by the tissue was identical with arginine vasopressin. The experimental findings support the hypothesis that conduction of action potentials along the hypot alamo -neurohypophysial tract releases vasopressin from the posterior pituitary. (Author)

AD-629 624 Fld. 6/16, 5/10, 17/8
CFSTI Prices: HC $3.00 MF $0.75
HONEYWELL INC ST PAUL MINN SYSTEMS AND RESEARCH DIV
A STUDY OF VISUAL SEARCH USING EYE MOVEMENT RECORDINGS.
Annual rept. no. 1, 1 Jan-31 Dec 65,
by L. G. Williams. 28 Feb 66, 79p. Rept. no. 12009-IR1,
Contract Nonr-4774 (00),
Unclassified report

See also AD-620 336.

Descriptors: (*Vision, Target discrimination), (*Target recognition, Visual perception), Target acquisition, Search theory, Colors, Geometric forms, Eye, Visual acuity, Identification, Probability, Sampling, Analysis of variance

The object of study in the present program is visual search in crowded fields. The basic goal is to predict search times for arbitrary targets in arbitrary backgrounds. The basis of our framework is that the specific objects at which an observer looks depends on the specific targets for which he searches. The average time to find a given target depends on what types of objects he is likely to look at and the numbers and types of objects in the search field. The report contains three appendices. Appendix A describes the apparatus used in the present studies and the rationale for measuring eye fixations. Appendix B is a methodological study which establishes the validity of generalizing to the real world from the restrictive laboratory situation. Appendix C shows how eye fixation data can be used to predict search times for specific targets in arbitrary fields.

AD-629 730 Fld. 6/16, 6/5
CFSTI Prices: HC $1.00 MF $0.50
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
SEASONAL VARIATIONS IN HUMAN PAROTID FLUID FLOW RATE IN A SUBTROPICAL CLIMATE.
Final rept. Jan 63-Dec 64,
by Ira L. Shannon, William A. Gibson, and James M. Terry. Jan 66, 13p. Rept. no. SAM-TR-66-3, Task 775303,
Unclassified report

Descriptors: (*Salivary glands, Secretion), Periodic variations, Climatology, Meteorological parameters, Dehydration, Stimulation, Saliva, Dentistry

Parotid fluid was collected under conditions of very minimal stimulation from 3,868 systemically healthy young adult males over a period of two calendar years. The study was carried out in a subtropical climate in which the only thermal discomfort resulted from the summer heat. Parotid flow rate was at a high level during the winter months, at a significantly lower (P<.001) level during the summer, and at intermediate levels during spring and fall. During the summer months the mean rate of parotid flow was 0.031 ml./minute; during the winter the flow rate mean increased by 35% to 0.042 ml./minute. A systemic state of relative dehydration was held responsible for the decrease in gland function found during the summer months. (Author)

AD-629 737 Fld. 6/16
CFSTI Prices: HC $2.00 MF $0.50
MIAMI UNIV CORAL GABLES FLA SCHOOL OF MEDICINE
HUMAN ELECTRORETINOGRAPHY AS A GAUGE OF VISUAL PERFORMANCE.
Annual progress rept. no... 3, 1 Jun 64-31 Aug 65, by Thorne Shipley. 31 Aug 65, 48p. Contract DA-49-193-MD-2344,
Unclassified report

See also AD-448 763.

Descriptors: (*Vision, Electroretinography), (*Electroretinography, Vision), (*Eye, Pathology), Humans, Embryos, Color vision, Adaptation (Physiology), Blindness, Retina, Rheumatic diseases, Organic pigments, Monochromatic light, Xenon lamps, Visual acuity, Ophthalmology

A short review of the clinical findings with the Cordis ERG apparatus to date is presented on: night-blindness, retinal detachment, rheumatoid arthritis, congenital aphakia, high myopia, primary and secondary retinitis pigmentosa, optic atrophy, glaucoma, trauma, cataract and neonates. A chart of the ERG patterns to be expected in most ophthalmological disorders has also been drawn up. Summaries are included of six manuscripts which are now in press or in preparation. Four new pieces of research equipment are described: three are special stimulators and one is a dual-channel ERG apparatus. The directions in which the research is now headed are noted and compared to those which were summarized in our last report. (Author)

AD-628 897 See Fld. 6/7

AD-628 898 See Fld. 6/7

AD-629 215 See Fld. 6/18

AD-629 312 See Fld. 20/4

AD-629 317 See Fld. 6/1
AD-629 329 See Fld. 6/1

6/17. PROTECTIVE EQUIPMENT

AD-629 053 Fld. 6/17, 6/1
BUENOS AIRES UNIV (ARGENTINA) INSTITUTO DE ANATOMIA GENERAL Y EMBRIOLOGIA
THE 5-HYDROXYTRYPTAMINE CONTENT AND SYNTHESIS OF NORMAL AND DENERVATED PINEAL GLAND,
by Amanda Pellegrino de Iraldi, E. M. Zieher, and E. De Robertis. 23 Jul 63, 9p. Contract AF-AFOSR-62-333,
AFOSR 65-2745
Unclassified report

Availability: Published in Life Sciences, n9 p691-666 1963. Copies to DDC users only.

Descriptors: (*Endocrine glands, Metabolism), (*Serotonin, Biosynthesis), (*Cells (Biology), Serotonin), (*Nerve cells, Serotonin), Concentration (Chemistry), Biological assay, Brain, Amino acids, Indoles, Rats, Argentina

By bioassay the 5-hydroxytryptamine (5-HT) content of the pineal gland was determined in normal rats and after 5 to 30 days of bilateral extirpation of the superior sympathetic ganglia. The normal 5-HT content varied between 10 and 20 ng of 5-HT base per pineal with a mean of 14.5 plus or minus 1.3 which corresponds to 11.1 micro-g/g. In brain the normal content was approximately 0.28 micro-g/g. Denervation produces a decrease in 5-HT of 73 per cent after 5 days, which stabilizes at about +50 per cent, between 10 to 30 days. The injection of 25 mg/kg 5-hydroxytryptophan increased the 5-HT content of the normal gland by 400 per cent in 30 minutes. In brain the increase was 200 per cent. In the denervated gland the synthetic capacity for 5-HT is reduced to about 1/5 of the normal. The injection of 25 mg/kg of 5-Ht showed no uptake by the normal pineal glands and by brain after 10 minutes. However the denervated gland increased the 5-HT content above the control level. The existence of two pools of 5-HT in the pineal gland, one in nerves and the other in the pinealocytes is demonstrated and some of their properties are discussed. (Author)

AD-629 077 See Fld. 13/12

6/18. RADIOBIOLOGY

AD-629 215 Fld. 6/18, 6/16
CFSTI Prices: HC $3.00 MF $0.75
BUENOS AIRES UNIV (ARGENTINA) CATEDRA DE FISICA BIOLOGICA
RADIATION DAMAGE IN MUSCLE MEMBRANES AND REGULATION OF CELL METABOLISM.
Annual technical rept. no. 2 (Final progress), 1 Jan-31 Dec 65,
by Juan Carlos Perez, and Peter Stewart. 31 Dec 65, 61p. Contract DA-ARO-49-092-65-G71,
Unclassified report

Descriptors: (*Radiation effects, Muscles), (*Muscles, Metabolism), Amphibians, Membranes (Biology), Cells (Biology), Trypsin, Ions, Enzymes, Oxygen consumption, Electrolytes (Physiology), Semipermeability, Biophysics, Sodium, Cesium, Potassium, Transport properties, Acetylcholine, Curare alkaloids, Physostigmine, Argentina

The report deals with studies of K and Cs ion effects on Na ion efflux and 02 consumption in resting muscle cell; and the action of trypsin and phospholipase C in the presence of Cs or K Ringer's solution on resting membrane potential. Na efflux results are consistent with calculated differences in penetration rates of C and K ions. But 02 consumption results are reversed from anticipated if considered a reflection of energy to drive the Na pump mechanism. Work has been done on membrane depolarization by various agents and their interaction and reversibility characteristics. Acetylcholine (Ach), Ach-Cs depolarizes membrane approaching a value of 55 mv. or approximately the threshold action potential of membrane. This may be reversed by displacement by washing with K-Ringer. It is prevented by d-tubocurarine but not eserine. Trypsin has a stronger effect on Cs than K treated membrane. Tr does not alter capacity of Ach to evoke depolarization but alters its reversibility when Cs is substituted for K. A model receptor system and allosteric action mechanisms are discussed. (Author)

AD-629 311 Fld. 6/18, 6/15
CFSTI Prices: HC $2.00 MF $0.50
USAF RADIATION LAB UNIV OF CHICAGO ILL
USAF RADIATION LABORATORY QUARTERLY PROGRESS REPORT NO. 58.
15 Jan 66, 35p. Contract AF 41 (609)-1693,AF 41 (609)-2977 Proj. AF-7757, Task 775702,
Unclassified report

Descriptors: (*Radiation effects, Physiology), (*Adenosine phosphates, Radiation effects), (*Metabolism, Radiation effects), (*Pressure breathing, Radiation effects), (*Radioprotective agents, Biological assay), Drugs, Radiation injuries, Hemopoietic system, Tissues

(Biology), X rays, Gamma rays, Barbiturates, Liver, Microsomes, Radiological dosage, Lethal dosage, Sublethal dosage, Yeasts, Tissue extracts, Whole body irradiation, Regeneration, Excision, Mortality rates, Desoxyribonucleic acids, Synthesis, Thyroxine, Acridines, Adrenocorticotropic hormone, Adrenal cortex, Tables, Rats

Contents: Further studies on the effects of various drugs on the adenosine triphosphatase activity of the hematopoietic tissues of rats exposed repeatedly to cobalt-60 gamma radiation; Studies on the effect of X-radiation on the hexobarbital metabolizing system of liver microsomes; Hypobaric oxygen exposure and acute radiation lethality in mice.

AD-629 421 Fld. 6/18, 22/1, 18/6
CFSTI Prices: HC $22.70 MF $1.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PROBLEMS OF RADIATION SAFETY OF SPACE FLIGHTS. PHYSICAL AND BIOLOGICAL INVESTIGATIONS WITH HIGH-ENERGY PROTON,
by Yu. G. Nefedova. 27 Dec 65, 231p Rept. no. FTD-MT-65-159,
TT 66-60723

Unclassified report

Edited machine trans. of mono. Problemy Radiatsionnoi Bezopasnosti Kosmicheskikh Poletov. Fizicheskie i Biologicheskie Issledovaniya s Protonami Bolshikh Energii, Moscow, 1964 239p.

Descriptors: (*Radiation hazards, Space flight), Safety, Radiobiology, Radiation effects, Radiation monitors, Radiation injuries, Radiological dosage, Permissible dosage, Cosmic rays, X rays, Gamma rays, Protons, Therapy, Shielding, Dosimeters, Solar flares, Cornea, Vestibular apparatus, Mice, Synchrocyclotrons, USSR

The monograph gives an account of the results of physical and biological experiments carried out with high-energy protons on the synchrocyclotron at the Joint Institute for Nuclear Research. The features of the radiation effect in space flight conditions and means of developing permissible radiation levels are considered. Materials on dosimetry and protection from proton radiation are presented. The results of experiments on the biological action of high-energy protons are stated. The coefficients of their relative biological efficiency are given. The results of research in the prevention and treatment of radiation injuries caused by the action of high-energy protons are presented. (Author)

AD-629 422 Fld. 6/18, 22/1
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
RADIATION SAFETY,
by Yu. Grigorev, and E. Kovalev. 1 Feb 66, 11p. Rept. no. FTD-TT-65-1682,
TT 66-60724

Unclassified report

Unedited rough draft trans. from Meditsinskaya Gazeta, (USSR) 21 Sep p3 1965.

Descriptors: (*Radiation hazards, Space flight), (*Radiation effects, Space flight), Cosmic rays, USSR, Safety, Space crews, Solar flares, Dosage, Radiation sickness

AD-629 512 Fld. 6/18
CFSTI Prices: HC $1.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
X-RAY INDUCED GLOMERULOSCLEROSIS IN RATS: MODIFICATION OF LESION BY FOOD RESTRICTION, UNINEPHRECTOMY, AGE,
by L. W. Wachtel, L. J. Cole, and V. J. Rosen Jr.. 11 Feb 66, 20p. Rept. no. USNRDL-TR-977, NAVMED MR005.08-1200-7

Unclassified report

Descriptors: (*Radiation effects, Kidneys), (*Kidneys, Radiation effects), Pathology, Food, Diet, Aging (Physiology), X rays, Radiation injuries, Growth, Body weight, Blood vessels, Desoxyribonucleic acids, Radiological dosage, Excision, Rats

The development of glomerulosclerosis was measured in the kidneys of rats under various conditions of irradiation and growth. Weanling rats showe kidneys were irradiated directly with 1,000 rad or 2,000 rad developed glomerulosclerotic lesions in 2 months; one-year old rats showed no evidence of lesions 2 months after irradiation with 2,000 rad. In the weanling rat the rapidity of development and severity of the glomerulosclerotic lesions were increased by growth or enlargement of the kidney subsequent to irradiation, and were slowed by growth retardation artificially produced through low-food intake. The induction of glomerulosclerosis by X-irradiation of the kidney is believed to be a latent result of damage to the kidney's vascular system, and that effects of this damage are accentuated in the growing kidney. (Author)

AD-629 723 Fld. 6/18
CFSTI Prices: HC $1.60 MF $0.50
TEXAS NUCLEAR CORP AUSTIN
THE KINETICS OF RECUPERATION FOLLOWING 55 MEV PROTON IRRADIATION.
Technical rept. for 28 Apr-30 Jun 65,
by Glenn V. Dalrymple, Ian R. Lindsay, John C. Mitchell, James D. Hall, and Ira L. Morgan. Feb 66, 11p. Contract AF 41 (609)-2418, Proj. AF-7757, Task 775704,
SAM TR-66-5

Unclassified report

Descriptors: (*Protons, Radiobiology), (*Radiobiology, Protons), (*Radiation injuries, Recovery), Gamma rays, Radiation effects, Radiological dosage, Mice

The kinetics of recuperation following initial doses of 470 rads of 55 Mev protons and 350 rads of Co60 gamma radiation were investigated by means of the paired-dose method. By using semilog plots, recovery half-times of 4.85 plus or minus .85 days and 2.02 plus or minus .45 days were found after initial doses of the protons and Co60 gamma radiation, respectively. (Author)

AD-629 014 See Fld. 20/10

AD-629 139 See Fld. 15/3

AD-629 316 See Fld. 6/8

AD-629 357 See Fld. 18/3

6/19. STRESS PHYSIOLOGY

AD-628 891 Fld. 6/19
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C STRUCTURAL MECHANICS LAB
MAN'S RESPONSE TO SHIP SHOCK MOTIONS,
by Richard M. Mahone. Jan 66, 27p. Proj. S-F015-14-04,
DTMB 2135

Unclassified report

Descriptors: (*Stress (Physiology), Shock waves), (*Underwater explosions, Stress (Physiology)), Motion, Ships, Tolerances (Physiology), Simulation

Men were exposed in the laboratory to motions similar to those experienced on the decks of ships subjected to underwater explosion attack. From measurements of the gross bodily response of men, empirical equations are derived which can be used to compute the velocities at which man will leave the deck under various conditions. Tolerance curves are developed which permit an estimate of the shock level at which injury takes place. (Author)

AD-628 945 Fld. 6/19
INDIANA UNIV MEDICAL CENTER INDIANAPOLIS CARDIOPULMONARY LAB
REPEATED, PROLONGED, LOW-INTENSITY +GZ EXPOSURES. ANATOMICAL STUDIES IN DOGS,
by R. H. Murray, J. Prine, and R. P. Menninger. 1965, 9p. Contract AF 33 (616)-8378, Proj. AF-7222,
AMRL TR-65-54

Unclassified report

Availability: Published in Aerospace Medicine, v36 n10 p972-6 Oct 10 1965. Copies to DDC users only.

Descriptors: (*Acceleration tolerance, Dogs), Gravity (Artificial), Pathology, Lungs, Kidneys, Cardiovascular system, Tissues (Biology), Anesthesia, Weightlessness, Stress (Physiology)

To determine the tolerance and the pathological effects of repeated, prolonged, low-intensity +Gz exposure, 6 dogs were anesthetized and exposed for one-hour periods to +2.2Gz (positive G) twice weekly for fifteen weeks. Four of the six dogs died all during the centrifugation. Autopsy revealed only moderate lung and visceral congestion and no anatomical lesions to which death could be attributed. Previous, similar studies in rats and dogs demonstrated significant renal lesions without mortality. It is suggested that these differences in results were due to variations in experimental technique. The restrictive experimental conditions forbid direct application of these data to human exposures. (Author)

AD-628 949 Fld. 6/19
NAVAL MEDICAL RESEARCH INST BETHESDA MD
INJURY MECHANISM OF INTERNAL ORGANS OF ANIMALS EXPOSED TO SINUOSIDAL VIBRATION.
Interim rept.,
by J. B. Boorstin, J. R. Hayes, and D. E. Goldman. 1965, 9p. Contract R-10,
NAVMED MR-005.14-3001.03-12

Unclassified report

Availability: Published in Aerospace Medicine, v37 n1 p23-28 Jan 1966. Copies to DDC users only.

Descriptors: (*Tissues (Biology), Vibration), (*Wounds + injuries, Tissues (Biology)), (*Stress (Physiology), Vibration), Heart, Lungs, Cats, Motion, Kidneys, Blood chemistry, X-ray photography

High speed X-ray cinematography was used to determine organ motion in vibrated cats. Data processing with a motion analyzer and a computer permits rapid analysis of X-ray photographs. Results of experiments at several amplitudes and frequencies are compared to show wave distortions due to heart-lung-chest wall interactions and frequency response characteristics associated with the means of restraint of the animal and the way in which the vibratory motion is impressed. Gross and microscopic pathological studies as well as some chemical determinations provide correlation of mechanical response and tissue damage. (Author)

AD-628 959 Fld. 6/19, 5/10
CFSTI Prices: HC $1.60 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
REPORTED VISUAL SENSATION DURING BRIEF EXPOSURE TO REDUCED SENSORY INPUT.
Research memo.,

by Thomas I. Myers, and Donald B. Murphy. Jan 60, 12p.

Unclassified report

Presented at Symposium on Hallucinations 27 Dec 1958 Washington, D. C.

Descriptors: (*Sensory deprivation, Vision), (*Visual perception, Stress (Physiology)), Performance (Human)

AD-629 067 Fld. 6/19, 6/5, 6/1
CFSTI Prices: HC $1.10 MF $0.50
ALBERT EINSTEIN MEDICAL CENTER PHILADELPHIA PA
EFFECT OF PROLONGED HYPOTHERMIA ON THE HEART AND LIVER.
Final rept.,
by Clem Russ. 15 Oct 65, 3p. Contract AF 41 (609)-2617,

Unclassified report

Descriptors: (*Hypothermia, Heart), (*Heart, Hypothermia), (*Liver, Hypothermia), Metabolism, Hypoxia, Glycolysis, Blood chemistry, Fatty acids, Cardiovascular system, Surgical techniques, Shock therapy, Pathology

AD-629 110 Fld. 6/19, 6/3
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
INVESTIGATIONS ON THE EFFECT OF REPEATED HIGH G FORCES ON FROGS,
by T. Gualtierotti, L. Gallitelli, and R. Margaria. 1959, 4p. Contract AF 61 (052)-23, AFOSR 3383

Unclassified report

Availability: Published in degli Atti del Congresso Internazionale di Medicina Aeronautica e Spaziale, v2 p527-9 Rome 27-31 October 1959. Copies to DDC users only.

Descriptors: (*Acceleration tolerance, Amphibians), Equilibrium, Gravity (Artificial), Ear, Eye, Blindness, Regeneration, Reflexes, Italy

The recovery of the sense of balance after high G centrifugation in frogs does not seem to be achieved through a mechanism involving sight or muscle sense or touch. The possibility exists that the otolothic system is rebuilt; in this case however the otoliths may be so small as not to be effected by 2000 G centrifugation. Some still unknown mechanism for a gravitational orientation may exist in frogs. (Author)

AD-629 111 Fld. 6/19
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
FUNCTIONAL FUNDAMENTAL CHARACTERISTICS OF THE NERVOUS SYSTEM IN ATHLETES AND THE EFFECTS OF PERFORMANCE,
by R. Margaria, and T. Gualtierotti. 1959, 10p. Contract AF 61 (052)-23, AFOSR 3453

Unclassified report

Availability: Published in Reprint. Copies to DDC users only.

Descriptors: (*Fatigue (Physiology), Central nervous system), (*Central nervous system, Fatigue (Physiology)), Performance (Human), Exercise, Stress (Physiology), Physical fitness, Nerve cells, Muscles, Neuromuscular transmission, Nerve fibers, Spinal cord, Reflexes, Metabolism, Statistical analysis, Italy

AD-629 198 Fld. 6/19
CFSTI Prices: HC $1.00 MF $0.50
AEROMEDICAL RESEARCH LAB (6571ST) HOLLOMAN AFB N MEX
URINARY EXCRETION OF VANILMANDELIC ACID AFTER PLUS GX IMPACT IN HUMANS,
by Peter G. Hanson, and Peter Foster. Mar 66, 16p. Rept. no. ARL-TR-66-6,

Unclassified report

Descriptors: (*Deceleration, Autonomic nervous system), (*Amines, Excretion), Urine, Stress (Physiology), Impact shock, Adrenal glands, Anxiety, Statistical analysis

Seven volunteer subjects were exposed once each to 25 plus Gx impact and sham impact on the Daisy Decelerator. Urinary excretion of vanilmandelic acid (VMA) was measured during two timed periods prior to and after impact or sham impact. The results indicate that the average urinary excretion of VMA increases with exposure to both impact or sham impact. The greatest average increase was observed after true impact. It is suggested that subject anxiety attendant to both experimental conditions causes an increased liberation of catecholamines. True impact may further stimulate this adrenergic activity. (Author)

AD-629 330 Fld. 6/19
ARMY MEDICAL RESEARCH AND NUTRITION LAB DENVER COLO
TROOP PERFORMANCE IN HIGH ALTITUDES,
by Wayne O. Evans, and James E. Hansen. 1966, 4p.

Unclassified report

Availability: Published in Army p1-4 1966. Copies to DDC users only.

Descriptors: (*Military personnel, Performance (Human)), (*Performance (Human), High altitudes), Acclimatization, Stress (Physiology), Mountains, Hypoxia, Adaptation (Physiology), Dehydration, Appetite, Diet, Vision Physical fitness, Oxygen, Carbon monoxide, Alcohols, Poisonous gases, Attitudes

If troops are taken very rapidly from a low altitude to one exceeding 10,000 feet, a number of severe symptoms and deficiencies in performance will appear. The classic symptoms of mountain sickness (headache, insomnia, fatigue, shortness of breath, dizziness and nausea, loss of appetite), though severe, will fade in most people within four days to one week. During the first week, the unit will be able to function only at low efficiency. The most serious sickness caused by high altitudes is lung congestion. A soldier stricken with this disorder must be evacuated to lower altitudes or he may die. After the passage of these initial symptoms, the effects of high altitude may be more insidious because men are not necessarily subjectively aware of them. On tasks requiring highly concentrated or prolonged attention, or sudden bursts of maximum energy, the men will be performing with up to 50 per cent less efficiency for two to three weeks. Night vision is also affected adversely. Finally, on those tasks which call for prolonged, physically heavy work, it may take more than six months for most men to return to previous standards of performance.

AD-629 101 **See Fld. 14/3**

6/20. TOXICOLOGY

AD-628 950 Fld. 6/20
NAVAL MEDICAL RESEARCH INST BETHESDA MD PHYSICAL BIOCHEMISTRY DIV
CONTRIBUTION OF ARYL GROUPS TO TOXIC INTERACTIONS AT CHEMORECEPTORS: 3-TROPANOL PHENYLACETATES AND THEIR HEXAHYDRO DERIVATIVES AS TOXIC AGENTS.
Interim rept.,
by Seymour L. Friess, L. J. Reber, and R. C. Durant. 8 Jan 65, 12p.
NAVMED MR-005.06-0010.01-39

Unclassified report

Availability: Published in Toxicology and Applied Pharmacology v8 n1 p88-96 Jan 1966. Copies to DDC users only.

Descriptors: (*Toxins + antitoxins, Esters), (*Chemoreceptors, Toxins + antitoxins), (*Tropane alkaloids, Toxicity), (*Cholinesterase inhibitors, Tropane alkaloids), Acetates, Cyclohexanes, Esters, Stereochemistry, Enzyme inhibitors

The new cyclohexylacetate esters of tropine ana psi-tropine were studied as toxins by the intravenous route in intact mice and cats, as twitch-potentiating agents on the rat phrenic nerve-diaphragm preparation, und as inhibitors of the acetylcholinesterase-acetylcholine system. In sharp contrast with their phenyl ester analogs, the cyclohexyl esters show an abrupt loss of capability to evoke stereospecific responses from chemoreceptor systems in the rat and mouse tissues, and yet display absolute levels of activity equivalent to those of the phenyl ester in the weaker psi-tropine series. With the acetylcholinesterase system studied as a key nerve enzyme, the cyclohexyl esters show exactly inverted behavior in the sense that they are highly sterospecific with respect to their inhibitory potencies (psi-tropine >tropine ester), and each cyclohexyl ester is significantly stronger as a reversible inhibitor than its phenyl analog. The results are interpreted in terms of possible modes of functional interaction between these esters and the chemoreceptors controlling the responses of the tissue and enzyme systems studied. (Author)

AD-629 003 Fld. 6/20, 6/6, 6/13
CFSTI Prices: HC $2.60 MF $0.50
BRYN MAWR COLL PA DEPT OF BIOLOGY
THE EFFECT OF ENVIRONMENTAL TEMPERATURE ON LETHALITY OF ENDOTOXIN AND ITS EFFECT ON BODY TEMPERATURE IN MICE.
Final rept., 1 Mar-31 May 65,
by L. Joe Berry. Dec 65, 24p. Contract AF 41 (609)-1764, Proj. AF-8241, Task 824101, AAL TR-65-12

Unclassified report

Descriptors: (*Toxins + antitoxins, Body temperature), (*Body temperature, Toxins + antitoxins), (*Serratia marcescens, Toxins + antitoxins), (*Temperature, Toxins + antitoxins), Poisoning, Tryptophan, Liver, Enzymes, Corticosteroid agents, Fevers, Hypothermia, Dosage, Sensitivity, Acclimatization, Mice

Acute exposure of mice to an environmental temperature of either 5C or 37C reduced the LD50 of a crude Serratia marcescens endotoxin from a high of 2300 micrograms in mice housed at 30C to an amount less than 40 micrograms. At 15C or 32C, the LD50 was, respectively, 800 micrograms and 550 micrograms, while at 25C it was 1200 micrograms. Control animals placed at each of these temperatures were able to maintain normothermia except for those at the high and low extremes where they became slightly hyperthermic and hypothermic. Following an injection of either twice the LD50 or a dose of 1000 micrograms, the thermoregulatory ability was upset at all temperatures except 30C. Mice at temperatures below 30C became progressively more hypothermic as the environment was increasingly cold and vice versa at higher temperatures. It is believed that endotoxin sensitizes mice to heat and cold rather than these temperatures sensitizing to endotoxin. After one week of acclimatization at 5C or 237C, the LD50 of endotoxin increased, respectively, to 790 micrograms and 260 micrograms. Inducibility of the liver enzyme tryptophan pyrrolase, believed to play a role in an animal's response to endotoxin, was evaluated at each environmental temperature. Only at the extremes was it suppressed. (Author)

AD-629 314 Fld. 6/20, 6/5
MARYLAND MEDICO-LEGAL FOUNDATION BALTIMORE
MORPHOLOGY AND MORPHOGENESIS OF LEAD ENCEPHALOPATHY,
by Angel Pentschew. 1 Dec 64, 28p. Contract PHS-NB-02275,

Unclassified report

213-302 O-66-3

Availability: Published in Acta Neuropathologica v5 p133-60 1965. Copies to DDC users only.

Descriptors: (*Metal poisoning, Brain), (*Lead, Metal poisoning), Pathology, Morphology (Biology), Histology, Toxicity, Metabolism, Blood circulation, Blood vessels, Capillaries, Nerve cells, Infants, Children

20 infantile cases of lead encephalopathy stimulated a reappraisal of its morphology and morphogenesis in the light of the current better comprehension of the principles regulating the blood flow in the brain and the recent progress of the biochemistry of lead poisoning. The underlying cause of lead encephalopathy is most probably a toxic disorder of porphyrin synthesis. It brings about a deficit of an unknown factor participating in the energy metabolism. The resulting chronic metabolic hypoxidosis affects the brain in a different way as in Wernicke's encephalopathy, manganese encephalopathy and in dysoric encephalopathy of the suckling rat produced by lead, in so far as in addition to dysoria the hemodynamics of the brain is also impeded. The reason is that in contrast to those encephalopathies, in lead poisoning the integrative homeostatic system as biological unit which encompasses the auto-regulation of the cerebral hemodynamics and the ability of shunting blood from less vital areas to the brain is also affected. The complete lack of structural changes in three cases of this series is in accordance with clinical observations in the literature that 75-85% of infants and children with lead encephalopathy recover spontaneously despite severe clinical signs. Therefore, the conclusion is reached that the metabolic hypoxidosis of the brain in saturnism is tolerated until additional stresses upset the labile balance between energy supply and energy demand.

AD-629 707 Fld. 6/20, 8/1, 7/3
CFSTI Prices: HC $4.00 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
SCREENING OF CHEMICAL TOXICITY TO MARINE BORERS.
Final rept., 1954-1962,
by H. Hochman, and H. P. Vind. Feb 66, 124p.
Rept. no. TR-R-426,
Proj. Y-R005-07-01-007,
Unclassified report

Descriptors: (*Marine borers, Toxicity), (*Toxicity, Marine borers), Chemical compounds, Tests, Selection, Control, Wood, Preservation, Tables

A former report (TR-048) describes the methods employed in testing the toxicity of chemicals toward adult Limnoria tripunctata and the larvae of Teredo diegensis and presents some toxicity data. This report presents all toxicity data gathered as a part of the toxicity screening program and analyzes this data with respect to chemical structure and toxicity mechanisms. These correlations are of necessity sometimes vague because of the lack of sufficient data on toxicity mechanisms as well as the multiple mechanisms by which some chemical compounds can act. The most striking and significant finding was the discovery that chemical compounds that were toxic to one borer genus frequently or even generally were little toxic or nontoxic to another genus. When a chemical compound exhibited toxicity to both genera of test animals employed in this test, the toxic mechanism was generally different in each case. An improved marine wood preservative, therefore, must contain a combination of agents that act by different toxic mechanisms rather than a single chemical compound or group of compounds that act by a single toxic mechanism or predominately by one mechanism. The results of the toxicity screening tests have been employed by the Laboratory as a guide in the selection of the compounds for its Harbor Screening Test Program. (Author)

Field 7-CHEMISTRY

7/2. INORGANIC CHEMISTRY

AD-628 923 Fld. 7/2, 21/9, 7/4
CFSTI Prices: HC $1.10 MF $0.50
ATLANTIC RESEARCH CORP ALEXANDRIA VA
A STUDY OF THE HYDROGEN-FLUORINE REACTION.
Final rept., 1 Feb 62-1 Feb 66,
by Joseph B. Levy. Feb 66, 5p. Contract AF 49(638)-1131, Proj. AF-9750 Task 975002, AFOSR 66-0410
Unclassified report

Descriptors: (*Oxidizers, Chemical reactions), (*Fluorine, Chemical reactions), (*Hydrogen, Chemical reactions), Thermochemistry, Inhibition, Hydrazine deratives, Fluorine compounds

The research program consisted of the study of the reactions of fluorine and fluorine-like species with hydrogen and other fuel-type molecules. The main effort was directed at the study of the gaseous hydrogen-fluorine system. The thermally-initiated reaction, including the effects of species that inhibit and promote the reaction were investigated. The area of interest also includes the study of fluorine with other species, such as hydrocarbons and the study of the reactions of fluorine-like compounds such as oxygen difluoride and tetrafluorohydrazine. The general approach is to study the kinetics of the reactions of these species in order to gain an understanding of the mechanisms of the reactions and of the ways in which species that inhibit or accelerate these reactions exert their effects. (Author)

AD-629 551 Fld. 7/2, 7/4
MISSISSIPPI UNIV UNIVERSITY
ULTRA-VIOLET ABSORPTION SPECTRA OF IODINE -N-HEPTANE- (PNC12)3 SOLUTIONS.
Revised ed.,
by N. B. Jurinski, and P. A. D. de Maine. 25 Jan 65, 5p. Contract AF-AFOSR-62-19, AFOSR 65-2373
Unclassified report

Revision of Manuscript submitted 30 Jul 64.

Availability: Published in Journal of Inorganic and Nuclear Chemistry v27 p1591-4 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Exchange reactions), (*Phosphonitrile chlorides, Absorption spectrum), (*Iodine, Absorption spectrum), (*Alkanes, Absorption spectrum), (*Ultraviolet spectroscopy, Complex compounds), N-heterocyclic compounds, P-heterocyclic compounds, Electrostatics, Solutions

The changes observed in the ultra-violet absorption spectra of (PNCl2)3 in n-heptane on addition of iodine are discussed. Unsuccessful attempts to obtain spectrophotometric evidence of interaction between (PNCl2)3 or (PNCl2)4 and donors or acceptors in solution are reported. (Author)

AD-629 552 Fld. 7/2, 7/4
MISSISSIPPI UNIV UNIVERSITY
SOLVENT EFFECTS ON THE ULTRA-VIOLET AND INFRA-RED ABSORPTION SPECTRA OF PHOSPHONITRILIC CHLORIDES.
Revised ed.,
by N. B. Jurinski, C. C. Thompson,Jr., and P. A. D. de Maine. Jan 65, 9p. Contract AF-AFOSR-62-19,
AFOSR 65-2374
Unclassified report

Revision of manuscript submitted 30 Jul 64.

Availability: Published in Journal of Inorganic and Nuclear Chemistry v27 p1571-8 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Exchange reactions), (*Phosphonitrile chlorides, Absorption spectrum), (*Ultraviolet spectroscopy, Phosphonitrile chlorides), (*Infrared spectroscopy, Phosphonitrile chlorides), Solvent action, Concentration (Chemistry), Temperature, Molecular energy levels, P-heterocyclic compounds, N-heterocyclic compounds, Solvents

A report is given of the solvent concentration, and temperature dependence of the high energy band centres (near 2100 A) for (PNCl2)3 or (PNCl2)4. Twenty different inert solvents were used. These data are not described by any published solvent shift theory. Infrared absorption spectra between 600 and 4000/cm for both compounds in different inert solvents are reported. Solvent shift theories are discussed. (Author)

AD-628 997 **See Fld. 7/4**

AD-629 049 **See Fld. 7/3**

AD-629 050 **See Fld. 7/3**

AD-629 063 **See Fld. 7/3**

AD-629 112 **See Fld. 7/3**

AD-629 115 **See Fld. 4/1**

AD-629 122 **See Fld. 7/3**

AD-629 173 **See Fld. 20/12**

AD-629 303 **See Fld. 7/4**

AD-629 380 **See Fld. 7/4**

AD-629 388 **See Fld. 7/4**

AD-629 438 **See Fld. 8/7**

AD-629 485 **See Fld. 7/3**

AD-629 488 **See Fld. 7/3**

AD-629 656 **See Fld. 7/4**

AD-629 663 **See Fld. 7/4**

7/3. ORGANIC CHEMISTRY

AD-629 049 Fld. 7/3, 7/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
THE CHEMISTRY OF C-1 METASTABLE STATES, 1-D AND 1-S,
by P. S. Skell, and R. R. Engel. 14 Dec 64, 4p.
Contract AF-AFOSR-503-64,
AFOSR 65-2143
Unclassified report

Supported in part by Army Research Office (Durham).

Availability: Published in Journal of the American Chemical Society v87 p1135 1965. Copies to DDC users only.

Descriptors: (*Carbon, Atomic energy levels), (*Atomic energy levels, Carbon), Vapors, Alkenes, Spiro compounds, Stereochemistry

Products of the triplet ground state of monatomic carbon (C-1) as well as the excited singlet S and D states were selectively produced. The ground state addition to olefins is stereospecific in the first step and non-stereospecific in the second, producing a spiropentane; the singlet D excited state adds stereospecifically in both steps. The excited states also yield other reaction products (e.g., 1,3-dimethyl allene from cis-2-butene).

AD-629 050 Fld. 7/3, 7/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
THE CHEMISTRY OF C-1 GROUND STATE, 3P,
by P. S. Skell, and R. R. Engel. 14 Dec 64, 3p. Contract AF-AFOSR-503-64, AFOSR 65-2142

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p1135 1965. Copies to DDC users only.

Descriptors: (*Carbon, Chemical reactions), (*Spiro compounds, Synthesis (Chemistry)), (*Atomic energy levels, Carbon), Vapors, Cyclopentanes, Stereochemistry, Alkenes

Additions of olefins to C-1 results in formation of spiropentanes and bisethanoallenes (see AD-629 049). The products obtained from the reactions of ground-state C-1 with the cis- and trans-2-butenes are reported. The spiropentane product mixtures were analyzed and assigned structures of isomeric 1, 2, 1', 2'-tetramethylspiropentanes The observations for the reactions of cis and trans-2-butenes with ground-state carbon atoms are summarized. A triplet C1 reagent is required for the postulated reaction scheme, and this assignment is in accord with the spectroscopically identified triplet P ground state. Ring formation by stereospecific mode precedes ring formation by the nonstereospecific mode.

AD-629 052 Fld. 7/3
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
SELECTIVITY OF GROUND-STATE C1 AND TRIPLET-STATE CYCLOPROPYLIDENE IN OLEFIN ADDITION REACTIONS,
by P. S. Skeel, and R. R. Engel. 18 Mar 65, 3p. Contract AF-AFOSR-503-64, AFOSR 65-2141

Unclassified report

Availability: Published in Journal of the American Chemical Society, v87 p2493 1965. Copies to DDC users only.

Descriptors: (*Cycloalkenes, Chemical reactions), (*Chemical bonds, Selection), Atomic energy levels, Sterochemistry, Reaction kinetics, Ground state

AD-629 063 Fld. 7/3, 7/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
REACTIONS OF CARBON VAPOR. I. REACTIONS OF TRIATOMIC CARBON WITH OLEFINS,
by P. S. Skell, L. D. Wescott Jr., J. P. Golstein, and R. R. Engel. 23 Dec 64, 9p. Contract AF-AFOSR-503-64, Proj. AF-9760, Task 976001, AFOSR 65-2144

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 n13 p2829-35 July 5 1965. Copies to DDC users only.

Descriptors: (*Carbon, Chemical reactions), (*Atomic energy levels, Carbon), (*Alkenes, Chemical reactions), Vapors, Reaction kinetics, Stereochemistry, Ban spectrum, Electric arcs, Dienes

A major component of carbon vapor is C-3. The chemical properties of this substance were studied at -196C in additions to olefins, the products being bisethanoallenes. Relative rates show C3 to be a nonselective dicarbene for olefin additions and yet it does not show insertion properties. In a paraffin hydrocarbon matrix at -196C, C3 is stable. This variety of C3 adds stereospecifically to cis- and trans-2-butenes, confirming the conclusion from spectroscopic analysis of the Swings bands that the ground state is singlet. Nonstereospecificity is observed with simultaneous deposition at -196C of C3 and the 2-butenes, indicative of a hitherto unobserved triplet state C3; limits of 0.1 to 0.00005/sec were placed on the half-life for decay of this triplet state to a singlet state. (Author)

AD-629 112 Fld. 7/3, 7/2
UNITED STATES INDUSTRIAL CHEMICALS CO CINCINNATI OHIO
PROTONATION OF ORGANOCYANOCOBALTATE (III) COMPLEXES. A NEW SYNTHESIS OF NITRILES,
by Jack Kwiatek, and Jay K. Seyler. 4 Sep 64, 7p. Contract AF 49 (638)-1214, AFOSR 65-2362

Unclassified report

Availability: Published in Journal of Organometallic Chemistry, v3 p433-7 1965. Copies to DDC users only.

Descriptors: (*Metalorganic compounds, Hydrogenation), (*Cobalt compounds, Metalorganic compounds), (*Nitriles, Synthesis (Chemistry)), Complex compounds, Potossium compounds, Bases (Chemistry), Cyanides, Catalysis

The protonation reactions of certain organocyanocobaltate (III) complexes were studied. Complexes containing organic groups (R), where R = -C-C=C or -C-C=O, are cleaved to yield RH. Those containing organic groups (R'), where R' = alkyl, benzyl or phenyl groups, undergo rearrangement to yield new complexes which release R'CN on further treatment with base. Mechanisms for these reactions are proposed and discussed. (Author)

AD-629 122 Fld. 7/3, 7/2
UNITED STATES INDUSTRIAL CHEMICALS CO CINCINNATI OHIO
PREPARATION OF ORGANOCYANOCOBALTATE (III) COMPLEXES,
by Jack Kwiatek, and Jay K. Seyler. 4 Sep 64, 14p. Contract AF 49 (638)-1214, AFOSR 65-2363

Unclassified report

Availability: Published in Journal of Organometallic Chemistry v3 p421-32 1965. Copies to DDC users only.

Descriptors: (*Metalorganic compounds, Synthesis (Chemistry)), (*Cobalt compounds, Metalorganic compounds), (*Complex compounds, Cobalt compounds), Potassium compounds, Cyanides, Alkenes, Halogenated hydrocarbons, Hydrogenation, Dehydrogenation, Catalysis, Molecular orbitals, Nuclear magnetic resonance, Spectra (Infrared)

Two methods were found for the preparation of organocyanocobaltate (III) complexes. The first involves addition of /Co (CN)5H/ (3-) to activated olefins. The second involves reaction of /Co (CN)5/ (3-) with organic halides. Studies show the mode of attachment of the organic groupings and indicate the role of certain of these complexes in hydrogenations and hydrogenolyses catalyzed by pentacyanocobaltate (II) anion. Allylic conversions of the type sigma-pi and pi-sigma were demonstrated. A mechanism for the cleavage of organic halides is discussed. (Author)

AD-629 295 Fld. 7/3, 20/1
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
ULTRASOUND CHEMICAL EFFECTS ON PURE ORGANIC LIQUIDS,
by Israel Pecht, Michael Anbar, and Alfred Weissler. 23 Sep 65, 3p. Contract AF-EOAR-87-65, AFOSR 66-0063

Unclassified report

Availability: Published in Science, v150 n3701 p1288-9 3 Dec 1965. Copies to DDC users only.

Descriptors: (*Organic compounds, Decomposition), (*Ultrasonic radiation, Organic compounds), (*Cavitation, Organic compounds), Liquids, Chemical reactions, Acetonitriles, Carbon tetrachloride, Hydrogen, Oxygen, Methane, Carbon dioxide, Carbon monoxide, Nitrogen, Water, Argon, Chlorine, Deuterated compounds, Israel

Molecular fragmentation of organic liquids was produced by cavitation due to ultrasound waves, even in the absence of water. The sonolysis of acetonitrile under argon yielded N2, CH4, and H2; but under oxygen the products were H2, CO, CO2, and H2O. Pure nonaqueous carbon tetrachloride also underwent sonolytic decomposition under either argon or oxygen, with the production of elemental chlorine. (Author)

AD-629 394 Fld. 7/3
TULANE UNIV NEW ORLEANS LA DEPT OF CHEMISTRY
TRIMETHYLENECYCLOPROPANE
by P. A. Waitkus, L. E. Peterson, and G. W. Griffin. 2 Nov 65, 3p. Contract DA-31-124-ARO (D)-182 ,NSF-G-13759 AROD 4375:7

Unclassified report

Prepared in cooperation with Louisiana State Univ., New Orleans.

Availability: Published in Journal of the American Chemical Society v88 n1 p181-3 Jan 5 1966. Copies to DDC users only.

Descriptors: (*Cyclopropanes, Synthesis (Chemistry)), Physical properties, Chemical properties

This simplest member of the class of radialenes was prepared by pyrolysis of the appropriate trisquaternary hydroxide. Both trismethylene cyclopropane (I) and tetramethylene-cyclobutane (II) may be generated in dilute ethanolic solution by dehydrohalogenation of the corresponding trisiodomethylcyclopropane. Delocalization energies calculated for I and II were 1.30 and 1.66 beta, respectively. Only transient existence could be expected for I in view of the high free valency anticipated at the termini of the exomethylene groups in both systems (0.90 and 0.88) as well as the inherent strain associated with the presence multiple trigonal centers in small ring systems. The tendency of I and its derivatives to polymerize was confirmed.

AD-629 448 Fld. 7/3
WETHERILL CHEMISTRY LABS PURDUE UNIV LAFAYETTE IND
SELECTIVE REDUCTIONS. VI. THE REACTION OF LITHIUM TRI-T-BUTOXY ALUMINOHYDRIDE WITH PHENOLIC ESTERS. A NEW ALDEHYDE SYNTHESIS,
by Paul M. Weissman, and Herbert C. Brown. 16 Aug 65, 5p. Contract DA-31-124-ARO (D)-117, AROD 1287:11

Unclassified report

Availability: Published in Journal of Organic Chemistry v31 p283-7 Jan 1966. Copies to DDC users only.

Descriptors: (*Esters, Reduction (Chemistry)), (*Aldehydes, Synthesis (Chemistry)), (*Lithium compounds, Oxidation-reduction reactions), Aromatic compounds, Aluminum compounds, Aluminates, Hydrides, Acetates

In contrast to the comparative inertness of alkyl esters, phenyl esters of aliphatic carboxylic acids readily react with lithium tri-t-butoxyaluminohydride in tetrahydrofuran at 0, forming the corresponding aldehydes in yields of approximately 70%. Except for the alpha-beta-unsaturated and cyclopropyl derivatives, this preparative method appears to be generally applicable to the conversion of anphatic and alicyclic carboxylic acids to

the corresponding aldehydes. The mildness of the reagent may be particularly advantageous in cases where the molecule may contain other functional groups which might be reduced competitively by other, more vigorous reagents. (Author)

AD-629 450 Fld. 7/3
WETHERILL CHEMISTRY LABS PURDUE UNIV LAFAYETTE IND
SELECTIVE REDUCTIONS. VII. REACTION OF LITHIUM TRIMETHOXYALUMINOHYDRIDE WITH SELECTED ORGANIC COMPOUNDS CONTAINING REPRESENTATIVE FUNCTIONAL GROUPS,
by Herbert C. Brown, and Paul M. Weissman. 20 Aug 65, 8p. Contract DA-31-124-ARO (D)-117, AROD 1287:12
Unclassified report

See also AD-629 448.

Availability: Published in Journal of the American Chemical Society v87 n24 p5614-9 1965. Copies to DDC users only.

Descriptors: (*Organic compounds, Reduction (Chemistry)), (*Reduction (Chemistry), Organic compounds), (*Lithium compounds, Oxidation-reduction reactions), Aluminum compounds, Hydrides, Aluminates, Alcohols, Thiols, Amines, Carboxylic acids, Anhydrides, Chlorides, Esters, Lactones, Aldehydes, Ketones, Organic nitrogen compounds, Heterocyclic compounds

The stoichiometry of the reaction of excess lithium trimethoxyaluminohydride with 56 selected organic compounds containing representative functional groups under standardized conditions (tetrahydrofuran solution, 0C) was examined in order to define the characteristics of the reagent for selective reductions. In its behavior the reagent resembles lithium aluminum hydride much more closely than it does lithium tri-t-butoxy-aluminohydride previously explored with this series of compounds. However, there are significant differences which should lead to useful applications. In particular, the presence of only a single reactive hydrogen should make possible a number of selective reductions which are impractical with lithium aluminum hydride because of the presence of four hydrogens which exhibit variable reducing capabilities in the reduction.

AD-629 470 Fld. 7/3
WETHERILL CHEMISTRY LABS PURDUE UNIV LAFAYETTE IND
SELECTIVE REDUCTIONS. VIII. THE STEREOCHEMISTRY OF REDUCTION OF CYCLIC AND BICYCLIC KETONES BY THE ALKOXY-SUBSTITUTED LITHIUM ALUMINUM HYDRIDES,
by Herbert C. Brown, and Harold R. Deck. 20 Aug 65, 7p. Contract DA-ARO (D)-31-124-106,.
AROD 1287:13
Unclassified report

Availability: Published in Journal of American Chemical Society v87 p5620-4 1965. Copies to DDC users only.

Descriptors: (*Ketones, Reduction (Chemistry)), (*Reduction (Chemistry), Stereochemistry), (*Stereochemistry, Ketones), (*Lithium compounds, Oxidation-reduction reactions), Aluminum compounds, Hydrides, Aromatic compounds, Organic oxygen compounds, Monocyclic compounds, Polycyclic compounds, Stability, Terpenes

The introduction of alkoxy substituents into lithium aluminum hydride provides a simple, convenient means of modifying the steric requirements and reducing properties of this powerful reducing agent. In order to ascertain the effect of these modifications on the steochemistry of reduction of monocyclic and bicyclic ketones, a systematic survey was undertaken of the reduction under standard conditions (tetrahydrofuran solution at 0C) of a set of selected monocyclic and bicyclic ketones by lithium aluminum hydride and certain of its alkoxy derivatives. The results reveal that lithium trimethoxyaluminohydride is more stereoselective than either lighium aluminum hydride or lithium tri-t-butoxyaluminohydride. In the case of bicyclic ketones, the trimethoxy reagent provides the less stable of the two possible alcohols in high isomeric purity. The results confirm the earlier conclusion that the direction of reduction is controlled by the stability of the product in flexible, relatively unhindered ketones and by the steric factor in rigid, sterically congested ketones. (Author)

AD-629 477 Fld. 7/3
MORLEY CHEMICAL LAB WESTERN RESERVE UNIV CLEVELAND OHIO
NITROBENZENESULFONYL PEROXIDES AS REAGENTS FOR AROMATIC SUBSTITUTION,
by Ralph L. Dannley, and Gerald E. Corbett. 28 Jun 65, 5p. Contract DA-ARO (D)-31-124-G242,
AROD 3342:7
Unclassified report

Availability: Published in Journal of Organic Chemistry v31 p153-6 1966. Copies to DDC users only.

Descriptors: (*Peroxides, Substitution reactions), (*Aromatic compounds, Substitution reactions), (*Substitution reactions, Peroxides), (*Esters, Synthesis (Chemistry)), Nitrobenzenes, Organic sulfur compounds, Pyrolysis, Benzene, Halogenated hydrocarbons, Fluorine compounds, Toluenes, Reaction kinetics, Sulfonic acids

The three isomeric bis (nitrobenzene sulfonyl) peroxides were prepared in 22-45% yield and found to be quite stable at room temperature. The thermal decomposition of m-nitrobenzenesulfonyl peroxide in benzene, fluorobenzene, chlorobenzene, and toluene produces 1 mole of m-nitrobenzenesulfonic acid and a 56-70% yield of the phenolic esters resulting from substitution in the aromatic substrate. The exclusive ortho-para substitution leads to the following orientations: fluorobenzene, 11% ortho, 89% para; chlorobenzene, 22%, 78%; and toluene, 35%, 65%. From the relative yields and orientations of the esters obtained from mixtures of benzene or toluene with chlorobenzene, the following partial rate factors were obtained: benzene, 1; chlorobenzene, ortho 0.5, para 3.7; and toluene, 17, 65. These data are most consistent with the classification of the reaction as an electrophilic substitution. (Author)

AD-629 485 Fld. 7/3, 7/2
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
OZONE: A NEW CLEAVAGE REAGENT FOR ORGANOSILANES,
by Leonard Spialter, and J. Dudley Austin. 3 Aug 65, 5p. Rept. no. ARL-65-241,
Proj. AF-7023, Task 702300 ,702309
Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p4406 1965. Copies to DDC users only.

Descriptors: (*Silanes, Decomposition), (*Ozone, Chemical reactions), (*Organic compounds, Silanes), Siloxanes, Dehydrogenation, Chemical bonds

Ozone has been found to cleave the Si-Y bond in molecules of the general structure R3Si-Y, where R is an organic group and Y is an alkyl, trialkylsiloxy, hydrogen, or hydroxyl substituent. In all cases the resulting products are hydroxysilanes and siloxanes. The rates of cleavage fall in the order Si-H >> (dehydration of SiOH to siloxane) Si-R. (Author)

AD-629 488 Fld. 7/3, 7/2
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
A STUDY OF SILICON DETERMINATION IN ORGANOSILICON COMPOUNDS BY X-RAY FLUORESCENCE WITH VACUUM SPECTROGRAPH,
by Frank L. Chan. 1965, 17p. Rept. no. ARL-65-228,
Proj. AF-7023, Task 702300 ,702307
Unclassified report

Availability: Published in S. E. C. Conference, Nottingham, England 19-23 p1-13 Jul 1965. Copies to DDC users only.

Descriptors: (*Silicon, Chemical analysis), (*Silicon compounds, Organic compounds), (*Silanes, Chemical analysis), X-ray spectroscopy, Vacuum apparatus, Fluoresence, Aromatic compounds

The instrument used is the X-ray vacuum spectrograph equipped with a power unit capable of producing 75 kV and 50 mA. It contains a tube having dual targets, one of tungsten and one of chromium, located inside the vacuum chamber. These targets may be switched to the operation position by remote-control mechanism. Provision has also been made in this unit for dual counters, one located in front of the other, that may be operated individually or simultaneously. Two analysing crystals of different 2d spacings are placed in the vacuum spectrograph with the remote-control device for rapid changing of these crystals. The compounds being studied by this method are the arylsilanes and others of known chemical compositions. The method eliminates the elaborate procedure necessary for conventional analytical methods. With the high counting rate, and by using crystals prepared in this Laboratory, results can be obtained in a few minutes. Since it is a non-destructive method, samples subjected to the determination of silicon are neither destroyed nor damaged. (Author)

AD-629 492 Fld. 7/3
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
SYNTHESIS OF UNSYMMETRICAL AZOALKANES FROM ACYLALKYLHYDRAZONES AND 1,2-DIALKYLHYDRAZINES,
by Leonard Spialter, Daniel H. O'Brien, Gerald L. Untereiner, and William A. Rush. 26 Apr 65, 10p. Rept. no. ARL-65-240,
Proj. AF-7023, Task 702300, 702308
Unclassified report

Availability: Published in Journal of Organic Chemistry v30 p3278-83 1965. Copies to DDC users only.

Descriptors: (*Organic nitrogen compounds, Synthesis (Chemistry)), (*Hydrazine derivatives, Oxidation), (*Hydrazones, Reduction (Chemistry)), Lithium compounds, Hydrides, Aluminates, Boiling point, Stereochemistry, Absorption spectrum, Chemical bonds, Azides, Alkanes

The syntheses of various unsymmetrical azoalkanes by oxidation of 1,2-dialkylhydrazines, obtained from the lithium aluminum hydride reduction of acylalkylhydrazones, are described. The boiling points are related to those of the analogous hydrocarbons. The azoalkanes, unlike dialkylhydrazines, show no additional structure-dependent interactions. Infrared and ultraviolet absorption data are presented and the trans-azo stretching frequency is assigned to 1562/cm. (Author)

AD-629 497 Fld. 7/3
DUKE UNIV DURHAM N C DEPT OF CHEMISTRY
CONDENSATIONS AT THE TERMINAL METH-

YL GROUP OF 1,3,5-TRIKETONES BY MEANS OF SODAMIDE IN LIQUID AMMONIA,
by K. Gerald Hampton, Thomas M. Harris, Constance M. Harris, and Charles R. Hauser. 16 Jul 65, 5p. Contract DA-ARO (D)-31-124-G770, AROD 3581:12

Unclassified report

Prepared in cooperation with Vanderbilt Univ., Nashville, Tenn. Dept. of Chemistry.

Availability: Published in Journal of Organic Chemistry v30 p4263-6 1965. Copies to DDC users only.

Descriptors: (*Ketones, Condensation reactions), (*Condensation reactions, Ketones), Sodium compounds, Amides, Ammonia, Ethers, Monocyclic compounds

Several types of condensations at the terminal methyl group of 1-phenyl-1,3,5-hexanetrione or its p-methoxy analog were effected by means of 3 molecular equiv. of sodamide in liquid ammonia or ether. These reactions include alkylations, carbonyl addition reactions (aldol type), benzoylation, and carbonation. Several of the products were converted to pyrones and/or pyridones. Attempts to effect terminal condensations by means of potassium amide or lithium amide were unsuccessful. (Author)

AD-629 515 Fld. 7/3
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
CHEMISTRY OF RARE EARTH AND ACTINIDE DERIVATIVES TETRAPYRROL PIGMENT DERIVATIVES OF RARE EARTH ELEMENTS AND ACTINIDES: ANALYTICAL SURVEY.
Rept. no. 1 on ATD work assignment no. 79, task 27,
by Boris Nartsissov. 4 Jan 66, 41p. Rept. no. atd-66-1,
TT 66-60739

Unclassified report

Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Actinide series compounds, Chemistry), (*Rare earth compounds, Chemistry), (*Pigments, Rare earth compounds), Phthalocyanines, Pyrroles, Metalorganic compounds, Synthesis (Chemistry), Luminescence, Spectrophotometers, Chemical analysis, Reaction kinetics, Photochemistry, Photosynthesis, Ion exchange, Actinium compounds, USSR, Bibliographies

The analytical survey is based on Soviet open sources published 1959-1964. The report consists of a Foreword, an Analytical Survey, an Annotated Bibliography, and 4 Appendixes (Topic Chart, Author Index, Association Index, Additional Entry). In the Foreword the analyst remarks that 'the chemistry of rare earth and actinide derivatives of tetrapyrrol pigments is one of the least explored problems in the literature; only occasional references can be found.' A different method of search is therefore used which is described in the Foreword. It provided coverage of Soviet literature from the end of 1962 to the end of 1964. ATD Report U-64-81 (Chemistry of Rare Earths and Actinides) comprehensively covered the literature on the subject up to the end of 1962. Also, the setup and use of the Topic Chart is described in the Foreword. In the Analytical Survey the analyst cites the indication that there is 'a definite concentration of efforts on the problem of metal phthalocyanines over any other groups of the tetrapyrrol pigments.' He lists the trends which could be traced in the Soviet study of metal phthalocyanines. (Author)

AD-629 547 Fld. 7/3
COLORADO UNIV BOULDER DEPT OF CHEMISTRY
BRIDGED POLYCYCLIC COMPOUNDS. XXX. EQUILIBRATION STUDIES OF SOME SUBSTITUTED DIBENZO BICYCLO (3.2.1) OCTADIENES AND DIBENZO BICYCLO (2.2.2) OCTADIENES,
by Stanley J. Cristol, Farn Pwu Parungo, Donald E. Plorde, and Kurt Schwarzenbach. 19 Feb 65, 10p. Contract AF-AFOSR-62-79, Proj. AF-9762, Task 976202,
AFOSR 65-2375

Unclassified report

See also AD-624 373.

Availability: Published in Journal of the American Chemical Society v87 p2879-86 1965. Copies to DDC users only.

Descriptors: (*Polycyclic compounds, Chemical equilibrium), (*Cycloalkenes, Chemical equilibrium), (*Stereochemistry, Polycyclic compounds), Dienes, Molecular isomerism, Stability

It was found that the endo-2 isomers of various substituted dibenzo bicyclo (3.2.1) octadiene derivatives were more stable than the exo epimers and that acid-catalyzed epimerizations were readily carried out. In addition, more severe conditions led, in many cases, to rearrangements from dibenzo bicyclo (3.2.1) octadienes to (2.2.2) isomers. These results are discussed in light of possible mechanisms and possible carbonium ion intermediates involved. (Author)

AD-629 549 Fld. 7/3
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
HYDROCARBON DIANION RADICALS,
by Edward G. Janzen, and J. Grady Pacifici. 14 Jul 65, 5p. Contract AF-AFOSR-62-53, Proj. AF-9762, Task 976201,
AFOSR 66-0305

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 p5504-5 1965. Copies to DDC users only.

Descriptors: (*Polycyclic compounds, Free radicals), (*Free radicals, Polycyclic compounds), Potassium, Furans, Phenanthrenes, Fluorenes, Cyclopentenes, Dienes, Colors, Hydrocarbons, Stability, Paramagnetic resonance

4,5-Methylenephenanthrene reacts with K-tetrahydrofuran to produce the yellow carbanion. When all the hydrocarbon is converted to the anion the red dianion radical forms rapidly. The orange carbanion derived from 9-phenylfluorene is also reduced to a new radical attributed to the dianion radical. Reduction of pentaphenyl cyclopentadienyl chloride resulted in a purple solution due to the pentaphenyl cyclopentadienide dianion radical or the corresponding ring closed compounds. (Author)

AD-629 553 Fld. 7/3, 7/4
MISSISSIPPI UNIV UNIVERSITY
SOLVENT EFFECTS ON CHARGE-TRANSFER COMPLEXES. II. COMPLEXES OF 1,3,5TRINITROBENZENE WITH BENZENE, MESITYLENE, DURENE, PENTAMETHYLBENZENE, OR HEXAMETHYLBENZENE,
by C. C. Thompson, Jr., and P. A. D. de Maine. 23 Mar 65, 8p. Contract AF-AFOSR-62-19, AFOSR 65-2372

Unclassified report

See also AD-416 143.

Availability: Published in Journal of Physical Chemistry v69 p2766-2771 1965. Copies to DDC users only.

Descriptors: (*Complex compounds, Exchange reactions), (*Nitrobenzenes, Complex compounds), (*Benzenes, Complex compounds), Solvent action, Reaction kinetics, Heat of formation, Absorption spectrum, Solvents, Alkanes, Cyclohexanes, Chloroform, Carbon tetrachloride, Band spectrum

Formation constants (K), heats of formation, and absorptiviiities of 1:1 charge-transfer complexes of 1,3, 5-trinitrobenzene with hexamethylbenzene, pentamethylbenzene, durene, mesitylene, or benzene dissolved in CC14, n-hexane, n-heptane, cyclohexane, or CHC13 were calculated from spectroscopic data collected at 20 and 45C for a dozen wave lengths between 2800 and 4200 A. K values for all complexes vary with solvent in the order: cyclohexane > n-heptane approx. = n-hexane> CCl4 > CHC13, with a 10 to 20-fold variation in K in passing from cyclohexane to CHC13 at 20C. K is independent of wave length near the band maximum, but in some systems K increases at longer wave lengths, probably because of the simultaneous formation of 1:1 and higher order complexes. (Author)

AD-629 554 Fld. 7/3, 11/9
CFSTI Prices: HC $3.00 MF $0.75
INSTITUTE FOR ORGANIC CHEMISTRY TNO UTRECHT (NETHERLANDS)
SYNTHESIS OF GROUP IV ORGANOMETALLIC POLYMERS AND RELATED COMPOUNDS.
Summary technical rept., Mar 59-29 Feb 64,
by A. J. Leusink, J. G. Noltes, H. A. Budding, and G. J. M. Van Der Kerk. Dec 65, 98p. Contract AF 61 (052)-218, Proj. AF-7342, Task 734203, AFML TR-65-192

Unclassified report

Descriptors: (*Metalorganic compounds, Polymerization), (*Polymers, Metalorganic compounds), (*Silanes, Polymerization), (*Germanium compounds, Polymerization), (*Tin compounds, Polymerization), (*Lead compounds, Polymerization), Heat-resistant materials, Synthesis (Chemistry), Denes, Alkynes, Chlorine compounds, Condensation reactions, Alkenes, Heterocyclic compounds, Netherlands

The synthesis and characterization are described of linear polymers, having a carbon chain regularly interrupted by the Group IV elements silicon, germanium, tin, or lead. Such polymers were obtained by means of: (1) poly-addition reactions involving an brganotin dihydride and either a dienic, a diynic, or a monoynic compound; (2) Wurtz-type poly-condensations involving appropriate combinations of p-chlorophyenyl and chloro derivatives of the Group IV elements. The synthesis and polymerization of vinyl-type Group IV organometallic monomers is dealt with briefly. Furthermore, interesting Group IV metal-containing heterocycles were prepared and also a few polymers containing, in addition to Group IV atoms, other, other heteroelements in their backbone. All polymer-forming reactions were studied by carrying out model reactions on a low-molecular weight level. (Author)

AD-629 638 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
BASE-CATALYZED INTRAMOLECULAR 1,3- AND 1,5-PROTON TRANSFERS,
by Donald J. Cram, F. Willey, H. P. Fischer, and Donald A. Scott. 28 Sep 64, 5p. Contract AF-AFOSR-124-63,
AFOSR 65-2377

Unclassified report

Availability: Published in Journal of the American Chemical Society v86 p5370-1 Dec 5 1964. Copies to DDC users only.

Descriptors: (*Protons, Chemical reactions), (*Molecular structure, Protons), Deuterated compounds, Alkenes, Alkydes, Catalysis, Molecular isomerism

A report is made on observations of intra-molecular proton (deuteron) transfers in a triene to give

a triarylmethane, and in an acetylene to give an allene.

AD-629 639 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
ELECTROPHILIC SUBSTITUTION AT SATURATED CARBON. XXII. INTRAMOLECULAR HYDROGEN TRANSFER REACTIONS IN BASE-CATALYZED ALLYLIC REARRANGEMENTS,
by Donald J. Cram, and Roy T. Uyeda. 1 Jun 64, 15p. Contract AF-AFOSR-124-63, Proj. AF-9762, Task 976202,
AFOSR 65-2380

Unclassified report

See also AD-623 855.

Availability: Published in Journal of the American Chemical Society v86 p5466-77 Dec 20 1964. Copies to DDC users only.

Descriptors: (*Hydrogen, Substitution reactions), (*Substitution reactions, Hydrogen), (*Stereochemistry, Substitution reactions), (*Alkenes, Substitution reactions), Catalysis, Benzenes, Deuterated compounds, Protons, Molecular isomerism, Reaction kinetics, Solvents, Exchange reactions

The base-catalyzed rearrangement of 3-phenyl-1-butene (I-h) to cis-2-phenyl-2-butene (II) in a variety of media containing deuterium donors (ROD) was studied, as has the rearrangement of 3-phenyl-1-butene-3-d (I-d) in media containing proton donors. Only minor amounts of trans-2-phenyl-2-butene (III) were produced in the rearrangements. The rates of hydrogen-deuterium exchange of II and III were demonstrated to be one to two powers of ten slower than the isomerization of I under the same conditions. Degradative experiments demonstrated that when I-h was isomerized to II in deuterated solvents, all of the deuterium introduced was in the 4-position of 2-phenyl-2-butene (II). In all runs, optically active I was employed, and the reactions were interrupted before isomerization was complete. Isotopic exchange of I was one to over two powers of ten slower than isomerization in all media. In tert-butyl alcohol-O-d (potassium-tertbutoxide as base), (-)-I-h underwent isotopic exchange at a rate at least ten times faster than racemization, both rates being vastly slower than the isomerization rate. (Author)

AD-629 640 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
ON THE CLAIM OF A BIMOLECULAR MECHANISM OF PROTOTROPY,
by D. J. Cram, and R. D. Guthrie. 24 Aug 64, 5p. Contract AF-AFOSR-124-63,
AFOSR 65-2379

Unclassified report

Availability: Published in Journal of the American Chemical Society, v87 n2 p397-8 Jan 20 1965. Copies to DDC users only.

Descriptors: (*Protons, Chemical reactions), (*Molecular structure, Chemical reactions), Organic nitrogen compounds, Chemical equilibrium, Molecular isomerism, Hydrogen, Deuterium, Imines

Re-examination of evidence for a one-stage mechanism of prototropy, using a methylene-azomethine rearrangement system, indicates that the claim for a Bimolecular mechanism is without secure foundation.

AD-629 641 Fld. 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
ELECTROPHILIC SUBSTITUTION AT SATURATED CARBON. XIII. STEREOCHEMICAL STABILITY OF ALLYLIC AND VINYL ANIONS,
by D. H. Hunter, and Donald J. Cram. 1 Jun 64, 16p. Contract AF-AFOSR-124-63, Proj. AF-9762, Task 976202,
AFOSR 66-0024

Unclassified report

See also AD-629 639.

Availability: Published in Journal of the American Chemical Society, v86 p5478-90 1964. Copies to DDC users only.

Descriptors: (*Substitution reactions, Stereochemistry), (*Stereochemistry, Substitution reaction), (*Alkenes, Substitution reactions), (*Hydrogen, Exchange reactions), Deuterated compounds, Catalysis, Benzenes, Styrenes, Reaction kinetics, Molecular isomerism, Ions, Stability

The potassium tert-butoxide catalyzed isomerization and hydrogen-isotope exchange reactions of cis- and trans-a-methylstilbene and a-benzylstyrene, and of cis- and trans-stilbene, were studied in tert-butyl alcohol and tert-butyl alcohol-O-d. The kinetics of deuterium incorporation and of isomerization of cisand trans-alpha-methylstilbene and alpha-benzylstyrene into one another can be made most internally consistent with a mechanism which involves noninterconverting cis- and trans-allylic anions as intermediates. The equilibrium constants for interconversions of the three olefins were determined, and the kinetic and thermodynamic data are most consistent with one another on the basis of this same mechanism. The allylic rearrangement of alpha-benzylstyrene into cis-alpha-methylstilbene was shown to proceed with 55% intramolecularity, and into trans-alpha-methylstilbene with 36% intramolecularity. A solvent kinetic isotope effect of (CH3)3COD/(CH3)3COH approx. 2 was observed for these isomerizations. (Author)

AD-629 681 Fld. 7/3
YALE UNIV NEW HAVEN CONN DEPT OF CHEMISTRY
THE DIMERIZATION OF GASEOUS BENZYNE,
by Margaret E. Schafer, and R. Stephen Berry. 19 Jul 65, 7p. Contract AF-AFOSR-183-63,
AFOSR 66-0058

Unclassified report

Prepared in cooperation with Chicago Univ., Ill., Inst. for the Study of Metals.

Availability: Published in Journal of the American Chemical Society v87 n20 p4497-9 20 Oct 1965. Copies to DDC users only.

Descriptors: (*Benzenes, Chemical reactions), Gases, Polymerization, Polycyclic compounds, Synthesis (Chemistry), Spectrum (Visible + ultraviolet), Absorption spectrum, Reaction kinetics, Mass spectroscopy

Benzyne is the primary organic product of the photo -initiated decomposition of benzenediazonium 2-carboxylate. Its presence and its ultraviolet absorption spectrum are estab
absorption spectrum are established by the coincident results of time-resolved optical and mass spectra. The integrated intensity of the ultraviolet absorption spectrum, and the intensity of mass peak 76, both measured as functions of time, lead to a rate constant for the dimerization of benzyne to biphenylene. The second-order constant has a value greater than or equal to 7 X 10 to the 8th power l./mole sec., and corresponds to a minimum reaction probability, per collision, of 0.007. (Author)

AD-629 683 Fld. 7/3
KANSAS STATE UNIV MANHATTAN DEPT OF CHEMISTRY
THE REACTIONS OF METHYL- AND N-BUTYLLITHIUM WITH DICHLOROMETHYL METHYL ETHER AND DICHLORODIPHENOXY METHANE,
by Richard N. McDonald, and Robert A. Krueger. 2 Jul 65, 7p. Contract AF-AFOSR-145-63, Proj. 9762, Task 976202,
AFOSR 66-0317

Unclassified report

Availability: Published in Journal of Organic Chemistry v30 p4372-5 Dec 1965. Copies to DDC users only.

Descriptors: (*Ethers, Chemical reactions), (*Phenyl ethers, Chemical reactions), (*Lithium compounds, Chemical reactions), Metalorganic compounds, Chlorine compounds, Ketones, Reduction (Chemistry)

AD-629 711 Fld. 7/3
PITTSBURGH UNIV PA DEPT OF CHEMISTRY
THE REACTIONS OF 2- AND 4-PICOLINE N-OXIDE WITH PHENYLACETIC ANHYDRIDE,
by Theodore Cohen, and John H. Fager. 3 Jun 65, 13p. Contract AF-AFOSR-344-63, Proj. AF-9762, Task 976202,
AFOSR 66-0318

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 n24 p5701-10 Dec 20 1965. Copies to DDC users only.

Descriptors: (*N-heterocyclic compounds, Chemical reactions), (*Anhydrides, Oxidation-reduction reactions), Benzaldehydes, Carbon dioxide, Acetates, Pyridines, Oxides, Aromatic compounds, Recombination reactions

The reactions of 2- and 4-picoline N-oxide with phenylacetic anhydride yield the oxidation--reduction products, benzaldehyde, carbon dioxide, picolines, and small quantities of diphenylmaleic anhydride (XII), in addition to rearrangement products. The latter consist predominantly of 2-pyridinemethanol phenylacetate (X) and 2-phenylethylpyridine (XI), in a ratio of about 1.5:1 in the case of 2-picoline N-oxide, and of 4-pyridinemethanol phenylacetate (XIV) and 4-phenylethylpyridine (XV), in a ratio of about 0.06:1 in the case of 4-picoline N-oxide. The product composition is unchanged when the reactions are performed in the presence of the radical trap m-dinitrobenzene. The rearrangement but not the oxidation products are thought to arise via the anhydrobase intermediates XIX and XX. The ester products in this case (and in the corresponding acetic anhydride reaction with 2-picoline N-oxide) are thought to be formed by nonradical paths while the phenylethylpyridines are probably formed by geminate recombination of benzyl and picolyl radicals or ions which are produced by fragmentation of the anhydrobases XIX and XX. (Author)

AD-629 740 Fld. 7/3
CFSTI Prices: HC $5.60 MF $0.75
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO
THEORETICAL STUDIES ON THE DEGRADATION OF LADDER POLYMERS. PART II. VAPORIZATION STUDIES.
Summary rept. Jan-Dec 64,
by Martin M. Tessler. Dec 65, 57p. Rept. no. ML-TDR-64-151-Pt-2,
Proj. AF-7342, Task 734203,

Unclassified report

Descriptors: (*Polymers, Degradation), (*Polycyclic compounds, Polymers), Programming (Computers), Monte carlo method, Vaporization, Thermal stability

The random degradation of four and six-membered ring ladder polymers were investigated by means of a digital computer and the results compared to a single chain polymer undergoing degradation under identical conditions. The percent vaporization versus time and the rate of weight loss versus time was plotted and significant differences were obtained. The results indicate that ladder polymers should have increased stability over single chain

polymers undergoing random degradation. (Author)

AD-629 742 Fld. 7/3
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF APPLIED CHEMISTRY
THE EFFECT OF DIELECTRIC CONSTANT ON THE RATE OF ANIONIC POLYMERIZATION,
by S. Bywater, and D. J. Worsfold. 29 Jul 65, 6p.
NRC 8767

Unclassified report

Availability: Published in Journal of Physical Chemistry v70 p162-6 Jan 1966. Copies to DDC users only.

Descriptors: (*Polymerization, Dielectric properties), (*Dielectric properties, Polymerization), (*Furans, Polymerization), Reaction kinetics, Soluents, Benzene, Styrene plastics, Furan resins, Propagation, Canada

Information is available in the literature on the propagation rate of polystyryllithium in benzene containing small amounts of tetrahydrofuran and also in pure tetrahydrofuran. The report describes the intermediate range between 1 and 70% tetrahydrofuran in benzene. The propagation rate of the ion pair and the extent of dissociation to free ions have been measured over the whole composition-range. The propagation rate of the free polystyryl anion has been measured over a restricted range at higher dielectric constants. The results have been compared with those predicted from classical dielectric theory. (Author)

AD-629 744 Fld. 7/3
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
THE CLEAVAGE OF PHOSPHORUS TO NITROGEN BONDS WITH HYDROGEN FLUORIDE,
by R. Greenhalgh, and J. R. Blanchfield. 13 Oct 65, 5p. Rept. no. DCBRL-479,

Unclassified report

Availability: Published in Canadian Journal of Chemistry v44 p501-4 1966. Copies to DDC users only.

Descriptors: (*Fluorides, Chemical reactions), (*Organic phosphorus compounds, Decomposition), (*Organic nitrogen compounds, Decomposition), Hydrogen compounds, Canada, Substitution reactions, Chemical bonds

Dialkyl phosphoramidates and alkyl P-alkylphosphonamidates react with hydrogen fluoride breading the P--N bond to yield the corresponding fluoridates. The cleavage occurred when the nitrogen was unsubstituted, but the yield of product was increased by methyl substitution on the nitrogen. The reaction with diphenyl N, N-dimethylphosphoramidate was not restricted to the P--N bond, since cleavage of the CO--P bonds took place giving, as the ultimate product, hexafluorophosphoric acid. The results obtained indicate that hydrogen fluoride is the most efficient of the hydrogen halides in cleaving P--N bonds. (Author)

AD-629 746 Fld. 7/3
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF APPLIED CHEMISTRY
THE OXIDATION OF PHENOLS. I. THE OXIDATION OF 2,6-DI-T-BUTYL-4-METHYLPHENOL, 2,6-DI-TBUTYLPHENOL, AND 2,6-DIMETHYLPHENOL WITH PEROXY RADICALS,
by E. C. Horswill, and K. U. Ingold. 24 Sep 65, 7p.
NRC 8757

Unclassified report

Availability: Published in Canadian Journal of Chemistry v44 p263-8 1966. Copies to DDC users only.

Descriptors: (*Phenols, Oxidation), (*Peroxides, Oxidation-reduction reactions), (*Ketones, Synthesis (Chemistry)), Cyclohexanones, Nitriles, Free radicals, Quinones, Canada

Previous work on the oxidation of alkyl phenols with peroxy radicals is summarized. The yields of the peroxy-cyclohexadienones formed from 2,6-di-t-butyl4-methylphenol in the alpha, alpha-azobis-isobutyronitrile-initiated oxidation of tetralin at 40C were measured quantitatively. The results suggest that not all the oxidation chains are initiated by isobutyronitrile peroxy radicals. The products from the oxidation of 2,6-di-t-butylphenol and 2,6-dimethylphenol with t-budyl peroxy radicals are found to be mainly dialkyl-p-benzoquinones and tetraalkyl diphenoquinones. (Author)

AD-629 748 Fld. 7/3, 7/4
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF APPLIED CHEMISTRY
REACTION OF OXYGEN ATOMS WITH ACETALDEHYDE,
by H. E. Avery, and R. J. Cvetanovic. 28 Jun 65, 8p.
NRC 8734

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n10 p3727-33 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Acetic anhydrides, Oxygen), (*Oxygen, Acetic anhydrides), Chemical reactions, Reaction kinetics, Nitrogen compounds, Dioxides, Photochemistry, Canada

The reaction of the ground-state triplet oxygen atoms with acetaldehyde at room temperature was reinvestigated. Two different sources of oxygen atoms have been used: mercury photosensitized decomposition of nitrous oxide and photolysis of nitrogen dioxide at 3660A. The results confirm the earlier conclusion from this Laboratory that the primary attack involves the abstraction of the aldehydic H atoms and not an insertion into the CH bonds of the aldehyde nor other primary steps suggested recently in the literature. (Author)

AD-629 750 Fld. 7/3, 7/4
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF APPLIED CHEMISTRY
CO-CATALYSIS IN FRIEDEL-CRAFTS REACTIONS. PART X. INTERACTION BETWEEN BORON TRIFLUORIDE AND ALKYL FLUORIDES.
by R. A. Woolhouse, and A. M. Eastham. 14 Sep 64, 5p.
NRC 8774

Unclassified report

See also AD-629 751.

Availability: Published in Journal of the Chemical Society, Section B, Physical Organic Chemistry, p33-36 1966. Copies to DDC users only.

Descriptors: (*Friedel-crafts reactions, Catalysis), (*Catalysis, Friedel-crafts reactions), (*Boron compounds, Fluorides), (*Halogenated hydrocarbons, Chemical reactions), Alkenes, Complex compounds, Vapor pressure, Absorption (Physical), Polymerization, Polyethylene plastics, Canada

Complex formation between boron trifluoride and either alkyl fluoride or olefin-hydrogen fluoride mixtures was investigated at 90C in the solvent methylene chloride by observing the vapour pressure of boron trifluoride above the solutions. The results suggest that boron trifluoride is absorbed both as RF.BF3 and as R.F (BF3)2. The latter complex, in which R' may be polymeric, is formed rapidly from olefins slowly from alkyl fluorides; olefins may be intermediates in the reaction of alkyl fluorides. (Author)

AD-629 751 Fld. 7/3, 11/9, 7/4
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF APPLIED CHEMISTRY
CO-CATALYSIS IN FRIEDEL CRAFTS REACTIONS. PART IX. POLYMERISATION OF PROPENE BY BORON FLUORIDE-METHANOL,
by T. Szell, and A. M. Eastham. 29 Jul 64, 5p.
NRC 8773

Unclassified report

See also AD-614 509.

Availability: Published in Journal of the Chemical Society, Section B, Physical Organic Chemistry, p30-3 1966. Copies to DDC users only.

Descriptors: (*Propenes, Polymerization), (*Friedel Crafts reactions, Catalysis), (*Catalysis, FriedelCrafts reactions), Polyethylene plastics, Catalysts, Boron compounds, Fluorides, Methanols, Reaction kinetics, Molecular weight, Concentration (Chemistry), Canada

The kinetics of the polymerisation of propene were studied in methylene chloride solution at -15, -35 a, and -50, with use of boron fluoride-methanol mixtures as catalyst. The rate expression for the disappearance of monomer was found. The molecular weight of the product increased from about 300 to about 1000 as the temperature was reduced from -15 to -80C and was independent of monomer concentation but increased slightly with co-catalyst concentration. (Author)

AD-628 904 **See Fld. 7/4**

AD-628 914 **See Fld. 11/8**

AD-629 165 **See Fld. 11/9**

AD-629 281 **See Fld. 11/9**

AD-629 282 **See Fld. 6/1**

AD-629 303 **See Fld. 7/4**

AD-629 393 **See Fld. 7/4**

AD-629 467 **See Fld. 7/4**

AD-629 614 **See Fld. 7/4**

AD-629 698 **See Fld. 20/2**

AD-629 707 **See Fld. 6/20**

AD-629 747 **See Fld. 7/4**

7/4. PHYSICAL CHEMISTRY

AD-628 889 Fld. 7/4, 20/13
CFSTI Prices: HC $2.00 MF $0.50
MIDWEST RESEARCH INST KANSAS CITY MO
DETERMINATION OF MIXED VIRIAL COEFFICIENTS.
Final technical rept.,
by Jerome Brewer. Dec 65, 40p. Contract AF 49 (638)-1190, Proj. AF-9750, Task 975002, AFOSR 66-0411

Unclassified report

Descriptors: (*Equations of state, Determination), (*Helium group gases, Equations of state), (*Nitrogen, Equations of state), (*Hydrogen, Equations of state), Argon, Helium, Neon, Mixtures, Kinetic theory, Pressure, Volume, Temperature, Errors, Compressive properties

An experimental apparatus was constructed and developed and with it the interaction second virial coefficients were measured from -125C to 50C

in 25C increments for the following systems: N2-Ar, Ar-H2, Ar-He, Ne-Ar, N2-H2, N2-He, Ne-N2, H2-H3, Ne-H2 and Ne-He. The excess and interaction second virial coefficients were determined usually within 0.1 cc/mole corresponding to an error in the ration of pressure change after mixing to P of 0.000005, by measuring the pressure change of mixing two pure gases at constant temperature and volume. This precision corresponds to about one part in 200,000 for conventional PVT experiments. The comparison between experimental values and those calculated by the Kihara potential was considered good at the higher temperatures and fair to poor at the lower temperatures where it was as much as 8 cc/mole. In the temperature range of -125C to 50C, the excess quantity, E, was empirically correlated to the absolute temperature by the relation, E = aT to the b power, where the value of b was essentially the same for most of the binary mixtures. (Author)

AD-628 904 Fld. 7/4, 7/3
OHIO STATE UNIV COLUMBUS DEPT OF CHEMISTRY
ELECTRON-IMPACT ENERGY SPECTRA OF ACETONE AND 2-BUTANONE.
Physical sciences research papers,
by S. M. Silverman, and E. N. Lassettre. 5 Feb 65, 8p. Contract AF 19 (122)-642, Proj. AF-7661, Task 766101,
AFCRL PSRP-177 ,AFCRL 65-880
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n1 p194-5 1 Jul 1965. Copies to DDC users only.

Descriptors: (*Acetones, Electron bombardment), (*Butanones, Electron bombardment), (*Electron bombardment, Ketones), Spectroscopy, Energy, Scattering, Electric currents

Zero-angle and wide-angle (6.5-7 degrees) electron-impact energy spectra for acetone and 2-butanone are presented and discussed. (Author)

AD-628 919 Fld. 7/4
CFSTI Prices: HC $2.00 MF $0.50
CINCINNATI UNIV OHIO
MATERIALS ANALYTICAL RESEARCH.
Summary rept. 1 Apr 64-31 Mar 65,
by Michael Hoch. Nov 65, 47p. Contract AF 33 (657)-10944, Proj. AF-7360 Task 736005, AFML TR-65-271
Unclassified report

Descriptors: (*Chemical analysis, Reviews), (*Materials, Analysis), (*Infrared spectroscopy, Analysis), (*Polymers, Separation), (*Fluorine, Microanalysis), Absorption spectrum, Gas chromatography, Osmosis, Distillation, Electrochemistry, X-ray diffraction analysis, Nitrogen, Halogens, Hydrazine derivatives, Cymenes, Yttrium alloys, Cobalt alloys

The report summarizes analytical research performed during the designated period 1 April 1964 through 31 March 1965 on experimental materials, both organic and inorganic, with particular emphasis on such techniques as infrared, mid infrared, visible absorption spectroscopy, gas chromatography, vapor pressure osmometry, elution fractionation for molecular weight determination, electrical procedures, x-rays, organic and inorganic chemical analysis. Particular attention is given to the yttrium-cobalt alloy systems and to 2-hydrazo-p-cymene. Other major results include: (1) a method for improving the separation of polymers by addition of a temperature gradient to the solvent gradient; (2) interpretion of infrared spectra in the cesium bromide region; (3) a method for the analysis fluorine based on the use of samarium chloride.

AD-628 975 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
CALIFORNIA UNIV LOS ANGELES
THE EFFECT OF PRESSURE ON MELTING.
Final rept.,
by George C. Kennedy. 1966, 5p. Contract Nonr-233 (28), Proj. NR-081-222,
Unclassified report

Descriptors: (*Melting, Pressure), (*Pressure, Melting), Mathematical analysis, Physical chemistry

The aim and research goals of this project was that of determining the general polymorphism and behavior of the fusion curve of various metallic elements at high pressures and high temperatures. This aim was not simply that of obtaining data but there was the hope of finding some general rules that describe the melting process of metals and sequency of polymorphic behaviors. This has been more successful than anticipated. It was shown in a number of papers that all the Group IV elements and the Group III-V elements have essentially identical phase diagrams. Furthermore, this research has shown by analyzing data obtained that the Simon fusion curve does not hold and that a very simple melting relationship (d delta V/V sub o)/dT=K) does hold.

AD-628 997 Fld. 7/4, 7/2
CFSTI Prices: HC $3.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
ION EXCHANGE IN FUSED SALTS. II. THE DISTRIBUTION OF ALKALI METAL AND ALKALINE EARTH IONS BETWEEN CHABAZITE AND FUSED LINO3, NANO3, AND KNO3,
by C. M. Callahan. 30 Dec 65, 31p. Rept. no. USNRDL-TR-970,
Contract AT (49-2)-1167,
Unclassified report

Descriptors: (*Ion exchange, Salts), (*Alkali metals, Ion exchange), (*Alkaline earth metals, Ion exchange), (*Nitrates, Ion exchange), Sodium, Calcium, Potassium, Barium, Rubidium, Cesium, Lithium compounds, Sodium compounds, Potassium compounds, Distribution, Minerals, Ions

A study was made of the ion-exchange distributions of Na, Ca, K, Ba, Rb, and Cs between the mineral exchanger chabazite and each of the fused salts LiNO3, NaNO3, and KNO3. The distribution coefficients and the selectivity sequences of the ions varied from salt to salt. The selectivity sequency obtained in fused LiNO3 was taken as the normal one and was in the order of increasing ionic radii of the respective periodic groups. In general the sequence was related to a size-charge effect, and transpositions in this sequence observed in fused NaNO3 and KNO3 were explained by the influence of the sieving properties of chabazite in depressing the distribution coefficients. In each melt a relationship was found that depended on the size of the chabazite channels, and the operation of a 'two-way traffic' mechanism for ion exchange. In these experiments ion charge was less important than ion size in determining selectivity order. (Author)

AD-629 001 Fld. 7/4, 20/8
CFSTI Prices: HC $1.60 MF $0.50
HARVARD UNIV CAMBRIDGE MASS DEPT OF CHEMISTRY
RESONANCES IN THE SCATTERING OF ELECTRONS FROM ATOMS,
by William H. Miller. 16 Feb 66, 20p. Contract Nonr-1866 (14),
Unclassified report

Descriptors: (*Electrons, Resonance scattering), (*Resonance scattering, Perturbation theory), (*Atomic energy levels, Resonance scattering), Ionization, Helium, Atoms, Elastic scattering, Inelastic scattering, Wave functions

A formal procedure is developed for describing the resonances in electron-scattering from atoms caused by metastable, auto-ionizing states. It is shown that the position of a particular resonance is given exactly by the usual Rayleigh-Schrodinger perturbation series pertaining to an unperturbed discrete state embedded in an unperturbed continuum. An expression is given for the width which shows explicitly what initial state i and final state f should be used in the 'golden rule' as applied to autoionization. The formal results are applied to the lowest 1Pu resonance in He (+) - e (-) scattering; i.e., the 2s2p 1Pu metastable state of He. The resonance energy obtained is 60.28 ev above the ground state of He, and the calculated width is 0.038 ev. These results are seen to be in excellent agreement with the experimental values. (Author)

AD-629 022 Fld. 7/4, 20/10
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
ON A POSSIBLE METHOD FOR CORRECTING ATOMIC WAVEFUNCTIONS FOR RELATIVISTIC EFFECTS,
by Russell A. Bonham. 3 Mar 65, 4p. Contract AF-AFOSR-602-64, Proj. AF-9760, Task 976002,
AFOSR 65-2148
Unclassified report

Prepared in cooperation with Tokyo Univ. (Japan), Dept. of Chemistry.

Availability: Published in The Journal of Chemical Physics v43 n4 p1434-5 15 Aug 1965. Copies to DDC users only.

Descriptors: (*Wave functions, Relativity theory), (*Relativity theory, Atomic orbitals), (*Atomic orbitals, Wave functions), Atomic structure, Electrons, Kinetic energy, Scattering, Helium

The primary effect of relativity in nonrelativistic atomic structure calculations is to increase the effective mass of the atomic electrons. The effect will be largest for the innermost electrons, but the electron exchange interaction will tend to spread the mass changes around among the other electrons in the system. This suggests that a possible way to include relativistic corrections in nonrelativistic calculations is to employ a different effective mass for each electron based on the Hartree one-electron energy for that electron as a first approximation. The use of this technique is investigated for the case of K-shell electrons in He-like atoms.

AD-629 024 Fld. 7/4, 20/10
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
MULTIPLE ELASTIC INTRAMOLECULAR SCATTERING IN GAS ELECTRON DIFFRACTION,
by R. A. Bonham. 8 Sep 64, 9p. Contract AF-AFOSR-602-64, Proj. AF-9760, Task 976002, AFOSR 65-2124
Unclassified report

Prepared in cooperation with Tokyo Univ. (Japan). Dept. of Chemistry.

Availability: Published in Journal of Chemical Physics, v43 n4 p1103-9 Aug 15 1965. Copies to DDC users only.

Descriptors: (*Electron diffraction analysis, Gases), (*Elastic scattering, Gases), Molecules, Electron bombardment, Approximation (Mathematics), Quantum mechanics, Atomic properties, Molecular structure

The effects of multiple elastic intramolecular scattering on gas-electron-diffraction patterns are calculated in the second Born approximation. Expressions for the first-order double- and triplescattering contributions are obtained. An approximate expression convenient for computation, for the first-order triple-scattering term is also given. The relationships of the magnitude of the multiple scattering to atomic number, atomic size, and molecular structure are investigated. It is shown that corrections to the reduced molecular-intensity function of the order of several percent can occur in

the case of triple scattering from three or more heavy atoms in close proximity. (Author)

AD-629 027 Fld. 7/4
LOUVAIN UNIV (BELGIUM)
AN EMPIRICAL METHOD FOR THE ESTIMATION OF BOND DISSOCIATION ENERGIES,
by A. Van Tiggelen, J. Peeters, and R. Burke. 1965, 6p. Contract AF-EOAR-42-63, Proj. AF-9751, Task 975102, AFOSR 65-2167

Unclassified report

Availability: Published in Chemical Engineering Science v20 p529-32 1965. Copies to DDC users only.

Descriptors: (*Chemical bonds, Dissociation), (*Dissociation, Energy), Equations, Thermochemistry, Heat of reaction, Heat of activation, Belgium

An empirical formula for the calculation of bond dissociation energies D (A-B) is suggested: D (A-B) = (1/2 alpha) (alpha-AD (A-A) + alpha-BD (B-B)), where alpha-A and alpha-B are constants characteristic of radicals A (.) and B (.) while alpha is either alpha-A or alpha-B, whichever has the smaller value. Values of alpha for thirty-four organic and inorganic radicals have been determined and tabulated. From values of D (A-B), heats of reaction Q can be calculated. Activation energies E for substitution reactions can then be evaluated with the help of Polanyi's relation: E = (const.)1-(const.)2.Q. (Author)

AD-629 045 Fld. 7/4, 20/4
CFSTI Prices: HC $1.00 MF $0.50
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
THEORY OF COAGULATION AND PRECIPITATION OF PARTICLES OF AEROSOL IN TURBULENT FLOW OF GAS. ON THE COEFFICIENT OF CAPTURE OF AEROSOL PARTICLES.
Research translation,
by V. G. Levich. Dec 65, 12p. Rept. no. G-T-R-65-11,
Contract AF 19 (628)-5034,
TT 66-60686

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, v99 p1041-4 1954.

Descriptors: (*Aerosols, Gas flow), (*Coagulation, Aerosols), Brownian motion, Turbulence, Particles, Hydrodynamics, Theory, Adhesion, USSR

In turbulent flow, precipitation of particles does not take place if the velocity of their fall in the field of gravity is small compared to the characteristic velocity of the turbulent disturbance (this always takes place for aerosol). An exception may be the region at a very small distance from the horizontal fixed surface, where turbulent motion of the fluid is hindered.

AD-629 061 Fld. 7/4, 20/2, 20/11
CFSTI Prices: HC $3.00 MF $0.75
MANLABS INC CAMBRIDGE MASS
PHYSICAL EVALUATION OF THIN FILMS OF SOLID STATE MATERIALS.
Final rept., 1 Dec 62-30 Nov 65,
by E. T. Peters, I. Grierson, and S. A. Kulin. Feb 66, 87p. Contract AF 19 (628)-2438, Proj. AF-5620, Task 562001,
AFCRL 66-132

Unclassified report

Descriptors: (*Films, Optical analysis), Pyrolytic graphite, Boron, Boron compounds, Phosphides, Copper, Phenanthrenes, Vapor plating, Vacuum apparatus, Electrodeposition, Substrates, Silicon, Single crystals, Electron diffraction analysis, Microscopy, X-ray diffraction analysis, Crystal lattices, Microstructures, Crystal structure

Characterization of the crystallinity and structural morphology of several high purity electronics-oriented materials has been carried out by light microscopy and X-ray and electron diffraction methods. These materials include vapor deposited thin films of boron and boron phosphide on single crystal silicon substrates via halide reduction, electrodeposits of copper onto single crystal copper substrates, thin films of carbon deposited onto quartz via pyrolysis of various hydrocarbons and zonerefined, polycrystalline phenanthrene. The results of structural characterization have been compared to the preparation procedures in an effort to establish optimum conditions for preparing large area, high perfection, single crystal films appropriate for electronic and optical property measurements by other workers and to determine the effect of impurity upon resultant film perfection. Precision lattice parameters have been determined for ultrapure phenanthrene, which has a monoclinic structure. These are a = 8.47 44A, b =6.1720A, c = 9.4805A, alpha = 98 deg 01 min. (Author)

AD-629 072 Fld. 7/4
YALE UNIV NEW HAVEN CONN DEPT OF PHYSICS
QUENCHING OF NA RADIATION BY HE,
by James H. Stamper. 21 Dec 65, 4p. Contract AF-AFOSR-249-64,
AFOSR 65-1950

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n2 p759-60 Jul 15 1965. Copies to DDC users only.

Descriptors: (*Sodium, Nuclear cross sections), (*Helium, Nuclear cross sections), Atomic spectroscopy, Atomic energy levels, Atomic orbitals, Resonance

According to Demtroder (Z. Physik, v. 166: 42, 1962) the effective cross section for the quenching of Na D resonance lines by He gas at a temperature of 200C is 0.34 x 10 to the -16th power sq cm. This result contradicts those of previous researchers who found no such effect. An attempt is made to explain Demtroder's findings theoretically. The implications of this experiment are viewed with some skepticism and it is concluded that quenching the Na D lines was not accomplished to the extent reported. (Author)

AD-629 075 Fld. 7/4
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
CONTACT POTENTIAL DIFFERENCE BETWEEN SILVER NITRATE AND SILVER.
Revised ed.,
by James L. Copeland, and Ralph L. Seifert. 19 Apr 65, 9p. Contract AF 49 (638)-313, Proj. AF-9763,
AFOSR 65-2110

Unclassified report

Revision of manuscripts submitted 27 Oct 64.

Availability: Published in Journal of the Electrochemical Society v112 n8 p831-6 Aug 1965. Copies to DDC users only.

Descriptors: (*Electrostatics, Silver compounds), (*Voltage, Electrochemistry), (*Silver electrochemistry), Nitrates, Voltage, Electrochemistry, Test methods, Phase studies

The silver nitrate-silver contact potential was determined from 190 to 280C by the Zisman dynamic condenser method. At the melting point of the salt the contact potential of liquid silver nitrate relative to silver is -530 mv, with a temperature coefficient of 0.14 mv/deg, and that of the solid salt is -608 mv. The discontinuity of 78 mv at the melting point is attributed primarily to a greater excess surface concentration of silver ions in the liquid than in the solid salt. (Author)

AD-629 103 Fld. 7/4
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO
THE EFFECT OF CHEMICAL COMBINATION ON THE SOFT X-RAY K EMISSION BANDS OF NITROGEN AND CARBON.
Technical rept., Jan-Apr 65,
by David W. Fischer, and William L. Baun. Nov 65, 20p. Rept. no. AFML-TR-255,
Proj. AF-7367, Task 736702,

Unclassified report

Descriptors: (*Nitrogen, X-ray spectroscopy), (*Carbon, X-ray spectroscopy), (*Carbides, X-ray spectroscopy), (*Nitrides, X-ray spectroscopy), X-ray spectrum, Band spectrum, Excitation, Electron beams, Proportional counters, Graphite, Diamonds, Carbon black

Chemical combination has a marked effect on the shape of the x-ray K emission bands of nitrogen and carbon. Nitrogen bands, from a few nitrides and carbon bands from graphite, diamond, lampblack and some metallic carbides are shown. The wavelengths of the most prominent parts of the bands are listed as are the half bandwidths and full bandwidths. Results were obtained using electron excitation, a lead stearate crystal and flow proportional counter. (Author)

AD-629 138 Fld. 7/4, 20/1, 8/10
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF MARINE PHYSICAL LAB
ULTRASONIC ABSORPTION IN MGSO4 SOLUTIONS AS A FUNCTION OF PRESSURE AND DIELECTRIC CONSTANT,
by F. H. Fisher. 1965, 9p. Rept. no. MPL-U-59/62,
Contract Nonr-2216 (05),

Unclassified report

Availability: Published in The Journal of the Acoustical Society of America v38 n5 p805-12 Nov 1965. Copies to DDC users only.

Descriptors: (*Magnesium compounds, Sulfates), (*Ultrasonic radiation, Absorption), Solutions, Sea water, Pressure, Dielectric properties, Relaxation time, Compressive properties, Dissociation

Measurements in the 100- to 500-kc/sec region have been made of ultrasonic absorption as a function of pressure and dielectric constant for 0.5 M solutions of MgSO4. Relaxation frequencies, reaction rates, and sound velocities are calculated from the results. The magnitude and pressure dependence of the chemical compressibility for aqueous solutions are in good agreement with the four-state dissociation model proposed by M. Eigen and K. Tamm /Z. Electrochem. 66, 93-107, 107-121 (1962)/ to explain ultrasonic abosrption at atmospheric pressure. Furthermore, it is pointed out that the effect of pressure on the equilibrium dissociation constant for aqueous solutions at low concentration, predicted with the same four-state model, is shown to be in excellent agreement with electrical-conductivity data as a function of pressure. No explanation of the unusual effects observed for ultrasonic absorption and relaxation frequency at lower dielectric constants can be made at this time. (Author)

AD-629 149 Fld. 7/4, 20/12
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
SOFT X-RAY EMISSION SPECTRUM OF METALS,
by Arnold J. Glick, and Pierre Longe. 27 Aug 65, 5p. Contract SD-101 ,AF-AFOSR-62-46
AFOSR 65-2931

Unclassified report

Prepared in cooperation with Liege Univ. (Belgium).

Availability: Published in Physical Review Letters v15 n14 p589-91 4 Oct 1965. Copies to DDC users only.

Descriptors: (*Metals, X-ray spectrum), Excitation, Theory, Electron transitions, Reaction kinetics, N-body problems, Mathematical analysis, Electromagnetic fields, Atomic energy levels

AD-629 208 Fld. 7/4
LEICESTER UNIV (ENGLAND) DEPT OF CHEMISTRY
EFFECT OF ADDED ELECTROLYTE ON THE ELECTRON SPIN RESONANCE SPECTRA OF SOLUTIONS OF METALS IN AMMONIA,
by R. Catterall, J. Corset, and M. C. R. Symons. 22 Oct 62, 4p. Contract AF-EOAR-80-64, Proj. AF-9710, Task 971001, AFOSR 66-0303

Unclassified report

Availability: Published in The Journal of Chemical Physics v38 n1 p272-3 1 Jan 1963. Copies to DDC users only.

Descriptors: (*Alkali metal compounds, Spectroscopy), (*Electrolytes, Solutions), Infrared spectroscopy, Electron spin resonance, Iodides, Ammonia, Electrons, Ions, Chemical reactions, Great Britain

Infrared and electron spin resonance studies were made of the effect of added electrolytes (Na, K, Cs iodides) on ammonia solutions of alkali metals. The equilibria between the 'solvated' electron and the 'expanded' metal ion is discussed. There was shown to be a definite interaction between the unpaired electrons and the added cations. (Author)

AD-629 232 Fld. 7/4, 20/12, 20/2
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
ELECTRON PARAMAGNETIC RESONANCE OF EU2+ IN CAWO4,
by J. Bronstein, and V. Volterra. 14 Sep 64, 8p. Contract AF-EOAR-63-64, AFOSR 65-2565

Unclassified report

Availability: Published in The Physical Review v137 n4A pA1201-04 15 Feb 1965. Copies to DDC users only.

Descriptors: (*Europium, Paramagnetic resonance), Crystallography, Calcium compounds, Tungstates, Single crystals, Doping

Single crystals of CaWO4 doped with Eu (2+) were investigated by electron paramagnetic resonance at 300, 77, 20, and 4K. A spectrum of tetragonal symmetry was observed and fitted to the spin Hamiltonian for tetragonal symmetry. The values of the parameters are given for 300, 77, and 20K. The absolute sign of the parameters was determined from observations at 4K. The hyperfine splitting constants are A (151)=-34.4 plus or minus 0.5, B (151)=-35.0 plus or minus 0.5; A (153)=-15.5 plus or minus 0.3, B (153)=-16.0 plus or minus 0.3; all in .0001/cm. (Author)

AD-629 237 Fld. 7/4
BRUSSELS UNIV (BELGIUM)
PHASE TRANSITIONS IN MATTER,
by R. Brout. 1964, 10p. Contract AF-EOAR-51-63, Proj. AF-9767, Task 976701, AFOSR 65-2951

Unclassified report

Availability: Published in Statistical Mechanics of Equilibrium and Non-Equilibrium, p253-61 1965. Copies to DDC users only.

Descriptors: (*Phase studies, Condensation), (*Condensation, Theory), Statistical mechanics, Belgium

AD-629 245 Fld. 7/4, 19/4
HULL UNIV (ENGLAND) DEPT OF CHEMISTRY
THERMAL AND ISOTHERMAL EXPLOSIONS IN THE INHIBITION OF THE H2+02 REACTION BY HYDROCARBONS,
by R. R. Baldwin, and R. W. Walker. 25 May 64, 10p. Contract AF-EOAR-31-63, AFOSR 65-2486

Unclassified report

Availability: Published in Transactions of the Faraday Society v60 n502 pt10 p1760-8 Oct 1964. Copies to DDC users only.

Descriptors: (*Explosions, Chemical reactions), (*Hydrogen, Chemical reactions), (*Oxygen, Chemical reactions), (*Hydrocarbons, Explosions), Propanes, Reaction kinetics, Alaphatic compounds, Alkenes, Chemical equilibrium, Thermochemistry, Great Britain

Studies of the inhibiting action of neopentane on the second limit of the hydrogen+oxygen reaction shows that its behaviour resembles that of methane, and differs markedly from that of ethane, propane, n- and iso-butane. These latter hydrocarbons inhibit the limit because the alkyl radicals formed in the primary termination processes react predominantly with oxygen to form an olefine and the inert HO2 radical. A similar reaction is not possible with the neopentyl radical, so that there is no direct inhibition, and a 'degenerate' inhibition mechanism occurs, in which the inhibition is due to reaction products which have not reached a stationary concentration. Under these conditions, the normally isothermal explosion boundary becomes thermal in character, and confirmation of this change is provided by the effects of different inert gases and vessel diameters. (Author)

AD-629 249 Fld. 7/4
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
THERMODYNAMICS OF CHEMICAL COUPLING,
by C. J. Pings, and E. B. Nebeker. 15 Mar 65, 8p. Contract AF 49 (638)-1273, AFOSR 66-0302

Unclassified report

Availability: Published in I and EC Fundamentals, v4 p376-81 Nov 1965. Copies to DDC users only.

Descriptors: (*Chemical reactions, Irreversible processes), (*Thermochemistry, Chemical reactions), Thermodynamics, Chemical equilibrium, Entropy, Reaction kinetics, Mathematical analysis

The applicability of irreversible thermodynamics to coupled chemical reactions is discussed. Coupling is distinguished from the common phenomenon of interference, and a sufficient condition for the existence of nontrivial chemical coupling is given. The phenomenological coupling coefficients are identified for a particular example of a reacting system near equilibrium. Linear transformations which destroy the Onsager relations, or which eliminate the coupling of chemical reactions, are shown to be not generally applicable; any such given transformation can be used only for a particular initial state of the system. Also, the physical significance of the stoichiometry of such transformed reactions is questionable. (Author)

AD-629 250 Fld. 7/4, 12/1
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
DIRECT EXPERIMENTAL TEST OF THE PY AND CHNC INTEGRAL EQUATIONS,
by P. G. Mikolaj, and C. J. Pings. 8 Nov 65, 4p. Contract AF 49 (638)-1273 ,Nonr-220 (40) AFOSR 66-0340

Unclassified report

Availability: Published in Physical Review Letters v15 n22 p849-52 29 Nov 1965. Copies to DDC users only.

Descriptors: (*Potential theory, Molecular beams), (*Approximation (Mathematics), Integral equations), Experimental data, Molecular properties, Thermodynamics, Distribution functions

AD-629 251 Fld. 7/4, 20/2
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
DIRECT DETERMINATION OF THE INTERMOLECULAR POTENTIAL FUNCTION FOR ARGON FROM X-RAY SCATTERING DATA,
by P. G. Mikolaj, and C. J. Pings. 9 Dec 65, 5p. Contract AF 49 (638)-1273, Proj. AF-9710 Task 971003, AFOSR 66-0341

Unclassified report

Availability: Published in Physical Review Letters v16 n1 p4-6 3 Jan 1966. Copies to DDC users only.

Descriptors: (*Argon, Molecular properties), (*Gases, Statistical mechanics), X rays, Scattering, Distribution functions, X-ray diffraction analysis

Experimental data for the radial distribution function for argon gas of moderate density were used to compute the intermolecular potential function. Results are in good agreement with the Lennard-Jones potential. (Author)

AD-629 252 Fld. 7/4, 20/6
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
REFRACTIVE INDEX AND LORENTZ-LORENZ FUNCTION FOR SATURATED ARGON, METHANE, AND CARBON TETRAFLUORIDE,
by C. P. Abbiss, C. M. Knobler, R. K. Teague, and C. J. Pings. 5 Feb 65, 6p. Contract AF 49 (638)-1273,Nonr-220 (40) AFOSR 65-2369

Unclassified report

Availability: Published in The Journal of Chemical Physics v42 n12 p4145-8 15 Jun 1965. Copies to DDC users only.

Descriptors: (*Argon, Optical properties), (*Methane, Optical properties), (*Halogenated hydrocarbons, Optical properties), (*Refractive index, Liquefied gases), Carbon compounds, Fluorides, Density, Temperature, Phase studies

By means of the principle of minimum deviation, the refractive index was determined for argon, methane, and carbon tetrafluoride as saturated liquids from the triple point to the critical point. For argon, some measurements were also made on the saturated gas. For argon and methane, known values of the densities were used to compute the Lorentz-Lorenz function over the entire range of the saturation curve. For carbon tetrafluoride these computations were made only up to 0.7 of the critical temperature due to the lack of density data at higher values. The Lorentz-Lorenz function varies little with density and temperature for the three liquid phases. The argon measurements indicate definite increases in the Lorentz-Lorenz function on isothermal condensation. (Author)

AD-629 253 Fld. 7/4
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
THE CONTINUOUS ABSORPTION SPECTRUM OF IODINE MONOCHLORIDE,
by E. B. Nebeker, and C. J. Pings. 2 Feb 65, 3p. Contract AF 49 (638)-1273, AFOSR 65-2368

Unclassified report

Availability: Published in The Journal of Physical Chemistry v69 n7 p2483 Jul 1965. Copies to DDC users only.

Descriptors: (*Iodine compounds, Absorption spectrum), (*Chlorides, Absorption spectrum), (*Absorption spectrum, Chlorides), Continuous spectrum, Measurement, Analysis of variances

AD-629 255 Fld. 7/4
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF PHYSICS
NUCLEAR RESONANCE IN SHEETS AND POWDERS OF COBALT,
by M. Kuznietz, and A. A. Hirsch. 1965, 15p.
Contract AF-EOAR-71-63, Proj. AF-9763,
Task 976302,
AFOSR 66-0279

Unclassified report

Availability: Published in Nuclear Magnetic Resonance and Relaxation in Solids Proceedings of the Colloque Ampere, University of Leuven (13th), p122-32 Sep 1-5 1965. Copies to DDC users only.

Descriptors: (*Cobalt, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Cobalt), Sheets, Powders, Magnetic properties, Heat treatment, Rolling (Metallurgy), Chemical milling, Surface properties, Test methods

An interpretation is suggested for the NMR of Co59 in sheets and powders of metallic cobalt, under the assumption that two different effects might influence the magnitude of the NMR signal: the enhancement of the applied rf field by displacements of the Bloch walls, and the penetration of the rf field only till the 'skin-depth'. The measurements were carried out by a modified Hartley oscillator, in which the sweep and the modulation of the frequency were both electric. The magnitude of the signal was found to be proportional to the mass of the cobalt powder taken for its calibration. The NMR signal, in annealed sheets of cobalt of different thicknesses which are much higher than the 'skin-depth', is proportional to the square root of the product of the electrical resistivity and the magnetocrystalline anisotropy constant. A linear relation is found between the NMR signal and the area of annealed sheets and evaporated thick films, showing that the NMR in bulk material is a surface phenomenon. The NMR signals were investigated from liquid nitrogen temperature up to 367K. The signal in powder decreases with the increase of the temperature, while in annealed sheet it increases in accordance with the suggested interpretation. A slight cold-rolling of annealed sheet (which reduces the thickness by less than 3%) decreases the signal practically to zero, while by removal of the external surface of the sheet (chemically) the signal appears again, which shows that the cold-rolling affects mainly the layer in which are located the nuclei responsible for the NMR. (Author)

AD-629 303 Fld. 7/4, 7/3, 7/2
MILAN UNIV (ITALY) ISTITUTO DI CHIMICA GENERALE
TRIPHENYLPHOSPHINE-GOLD (0) GOLD (1) COMPOUNDS,
by L. Malatesta, L. Naldini, G. Simonetta, and F. Cariati. 12 Apr 65, 3p. Contract AF-EOAR-9-64,
AFOSR 65-2396

Unclassified report

Availability: Published in Chemical Communications n11 p212 9 Jun 1965. Copies to DDC users only.

Descriptors: (*Phosphines, Complex compounds), (*Gold compounds, Complex compounds), Oxidation, Oxidation-reduction reactions, Molecular structure, Magnetic properties, Chemical bonds

Chlorotriphenyl phosphine gold (I) was reacted with sodium borohydride in ethanol to obtain a red compound almost insoluble in ethanol, slightly soluble in chloroform and dichloromethane, and which did not contain boron. The fact that it did not contain hydride hydrogen was confirmed by the i.r. spectrum, both in the solid state and in solution. The compound corresponded analytically to Au5L4Cl, 3.5H2O (I), where L is P (C6H5)3. This same compound was also obtained by using as reducing agent lithium aluminium hydride or ethanolic potassium hydroxide. Compound (I) by digestion in cold methanol slowly dissolved giving Au5L4Cl, 4CH3OH (II). Compounds (I) and (II) had an ionic structure: by exchange reaction with nitrate, perchlorate, and tetraphenylborate anions, compound (II) gave the corresponding salts which all behaved as uni-univalent electrolytes like compound (II) itself. The behaviour of compound (II), when it was heated under reflux in ethanol, was found to be in accordance with the formula reported in which one atom of gold may be considered as having oxidation-number (I), and the other four as having oxidation-number zero: when its methanolic solution was heated under reflux in an inert atmosphere for 24 hr., 4/5 of the gold was separated as metal while 1/5 was recovered from the solution as AuCIL2.

AD-629 324 Fld. 7/4, 20/10
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
RELATIVE TRANSITION PROBABILITIES FOR PROMINENT NI I AND NI II LINES IN THE NEARULTRAVIOLET,
by G. D. Bell, D. R. Paquette, and W. L. Wiese.
4 Jun 65, 14p.

Unclassified report

Supported in part by ONR, ARPA.

Availability: Published in The Astrophysical Journal v143 n2 p559-72 Feb 1966. Copies to DDC users only.

Descriptors: (*Nickel, Atomic spectroscopy), Electron transitions, Line spectrum, Spectra (Visible + ultraviolet), Electric arcs, Quantum mechanics

Relative transition probabilities of sixteen Ni I lines and fifty-three Ni II lines in the wavelength range from 2000 to 3600 A have been measured with a wall-stabilized arc. The arc was operated at 10 amperes in argon with a small admixture (0.01 per cent) of nickel carbonyl. The spectrum was photoelectrically observed along the arc axis through the hollow electrodes. The relative intensity calibrations were performed by utilizing calibrated tungsten-strip lamps or the continuous emission of a hydrogen arc operated at known plasma conditions. The axis temperature of the argon nickel-carbonyl arc was determined from intensity measurements of argon lines of known transition probabilities and the application of the arc plasma equations. For most of the relative f-values the experimental and theoretical uncertainties are 8 per cent or better, but for a few weak lines the uncertainties go as high as 30 per cent. Comparisons with other experimental and theoretical results are undertaken and fair agreement is obtained. (Author)

AD-629 333 Fld. 7/4
JOHNS HOPKINS UNIV BALTIMORE MD
SPECTRA OF DOUBLY AND TRIPLY IONIZED YTTERBIUM, YB III AND YB IV,
by B. W. Bryant. 11 Feb 65, 11p. Contract AF 49 (638)-1497,
AFOSR 65-2875

Unclassified report

Availability: Published in Journal of the Optical Society of America v55 n7 p771-9 Jul 1965. Copies to DDC users only.

Descriptors: (*Ytterbium, Spectroscopy), (*Atomic energy levels, Ytterbium), Quantum statistics, Ions, Line spectrum, Tables

The emission spectrum of ytterbium was photographed under varied conditions from 600 to 11 000 A in order to obtain a complete description of the spectra of the doubly and triply ionized species. The main transition arrays of these species were identified, and where feasible, the analysis was carried through. All 41 energy levels, 28 odd and 13 even, belonging to the 4f (14), 4f (13) 5d, 4f (13)6s, 4f (13)6p, and 4f (13)7s configurations of Yb III have been experimentally determined along with the appropriate quantum numbers. Eleven of 20 possible 4f (13)6d levels and their quantum numbers have also been determined. Many Yb III levels are supported by intermediate coupling calculations. The ionization potential of Yb III was determined to be 25.4 plus or minus 0.5 eV from the Rydberg formula. The two 2F 4f (13) levels of Yb IV have been determined in addition to 20 of a possible 107 4f (12)5d levels of which a few are expected to be spurious. (Author)

AD-629 362 Fld. 7/4
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF SPACE SCIENCE LAB
MEASUREMENTS OF ABSOLUTE TOTAL CROSS SECTIONS FOR RARE-GAS SCATTERING,
by Erhard W. Rothe, and R. N. Neynaber. 12 Aug 65, 3p.

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n11 p4177-9 Dec 1 1965. Copies to DDC users only.

Descriptors: (*Helium group gases, Nuclear cross sections), Helium, Argon, Krypton, Nuclear scattering

AD-629 380 Fld. 7/4, 7/2
WASHINGTON UNIV SEATTLE DEPT OF CHEMISTRY
INFRARED SPECTRUM OF (12)C (18)O2,
by Charles Chackerian,Jr., and David F. Eggers,Jr.. 19 Mar 65, 3p. Contract AF 49 (638)-797, Proj. AF-9710, Task 971003,
AFOSR 65-2163

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n2 p757-8 15 Jul 1965. Copies to DDC users only.

Descriptors: (*Carbon dioxide, Spectra (Infrared)), Absorption spectrum, Band spectrum, Labeled substances

The observed vibrational-band centers of (12)C (18)O2 between 1800 and 5000/cm are reported and compared with calculated values. A 1.5 m Ebert vacuum-grating spectrometer was used with spectral slitwidth between 0.1 and 0.3/cm to obtain the spectrograms. The vibrational -band centers given are believed to be accurate to plus or minus 0.05/cm. (Author)

AD-629 388 Fld. 7/4, 7/2
SYRACUSE UNIV N Y DEPT OF CHEMISTRY
NEAR-INFRARED SPECTRUM OF LIQUID WATER FROM 30 TO 374 DEGREES,
by Erwin Fishman, and Pierre Saumagne. 1965, 3p. Contract AF 49 (638)-3,
AFOSR 65-2367

Unclassified report

Prepared in cooperation with Brest Univ. (France). Supported in part by the French AEC.

Availability: Published in Journal of Physical Chemistry v69 p3671 1965. Copies to DDC users only.

Descriptors: (*Water, Spectra (Infrared), Absorption spectrum, Vapors, Phase studies, Organic solvents

Conclusions: (1) There is a very strong effect of temperature, since the single band becomes two bands and the frequencies shift. (2) However the structure changes, no totally free water molecules are present since no band is observed at 3750/cm. (3) If the higher frequency band appearing at 200 is assumed to result from nonhydrogen -bonded species, then these results are consistent with the theory of Marchi and Eyring giving the fraction of monomeric molecules as a function of temperature. (4) These two peaks can also reasonably be explained as nu3 and nu1, since their frequency difference is the same as found for nu3 and nu1 in the vapor phase and in dilute solutions of water in inert organic solvents. (Author)

AD-629 393 Fld. 7/4, 7/3, 11/9
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
DIELECTRIC RELAXATION IN LIQUID POLYPROPYLENE OXIDES,
by M. E. Baur, and W. H. Stockmayer. 20 Aug 65, 8p. Contract DA-19-020-ORD-4556, AROD 349:20

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n12 p4319-25 Dec 15 1965. Copies to DDC users only.

Descriptors: (*Propenes, Dielectric properties), Polymers, Epoxy plastics, Molecular weight, Temperature, Dipole moments, Organic oxygen compounds

The dielectric properties of undiluted liquid atactic polypropyleneoxide have been studied as functions of temperature and molecular weight. The principal dispersion occurs at essentially the same frequency for all molecular weights at a given temperature, but at ower frequencies there is a small secondary loss peak that depends strongly on molecular weight. This secondary dispersion is shown to result from relaxation of a 'cumulative' dipole, about 0.18 D per monomer unit, whose resultant magnitude depends on the long-range conformation of the chain molecule. Experimental relaxation times for the secondary dispersion agree well with predictions based on Rouse-Bueche-Zimm theory. The main dispersion shifts with temperature according to the WLF equation. (Author)

AD-629 396 Fld. 7/4, 20/8
VERMONT UNIV BURLINGTON DEPT OF PHYSICS
INTERACTION POTENTIALS OF SIMPLE NONPOLAR MOLECULES WITH BORON NITRIDE.
Master's thesis,
by A. D. Crowell, and Chai Ok Chang. 1 Jul 65, 4p. Contract DA-31-124-ARO (D)-172, AROD 4403:4

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n12 p4364-7 Dec 15 1965. Copies to DDC users only.

Descriptors: (*Boron compounds, Molecular association), (*Nitrides, Boron compounds), Nitrides, Atomic energy levels, Solid state physics, Molecular energy levels, Argon, Nitrogen, Adsorption

The interaction energies of Ne, Ar, Kr, Xe, N2, and CH4 near a semi-infinite hexagonal boron nitride lattice at the potential minimum have been calculated using lattice sums of a (6-12) potential. Potential constants were obtained from empirical values corresponding to like-molecule interactions and by the use of combination rules. Literature values for the gas-molecule parameters were used, and the necessary constants for boron nitride were found from its solid-state physical properties. Comparisons are made with other calculations and with experimental results. (Author)

AD-629 397 Fld. 7/4
RIAS INC BALTIMORE MD
SEMIRIGOROUS LCAO-MO-SCF METHODS FOR THREE-DIMENSIONAL MOLECULAR CALCULATIONS INCLUDING ELECTRON REPULSION,
by Joyce J. Kaufman. 13 Apr 65, 5p. Contract AF 49 (638)-1220 ,DA-31-124-ARO (D)-203 AROD 5084:5

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n10 pS152-6 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Molecular orbitals, Mathematical analysis), Molecular structure, Chemical bonds, Hamiltonian, Chemical compounds, Inorganic compounds, Organic compounds

AD-629 400 Fld. 7/4
CFSTI Prices: HC $3.00 MF $0.75
VIRGINIA UNIV CHARLOTTESVILLE
THE VISCOSITY OF FOUR BINARY, GASEOUS MIXTURES AT 20 AND 30C.
Technical rept.,
by J. Kestin, Y. Kobayashi, and R. T. Wood. Jan 66, 63p. Rept. no. BRN-19-P, Contract Nonr-3623 (00), Proj. NR-098-038,

Unclassified report

Prepared in cooperation with Brown Univ., Providence, R. I.

Descriptors: (*Gases, Viscosity), (*Helium, Viscosity), (*Krypton, Viscosity), (*Nitrogen, Viscosity), (*Carbon dioxide, Viscosity), (*Argon, Viscosity), Mixtures, Diffusion, Transport properties

The binary mixtures consisted of the following systems: He-Kr, He-N2, N2-CO2, and Ar-CO2.

AD-629 464 Fld. 7/4
IOWA UNIV IOWA CITY DEPT OF CHEMISTRY
ABSOLUTE INFRARED INTENSITIES OF THE FUNDAMENTAL ABSORPTION BANDS IN SOLID CARBONYL SULFIDE,
by Haruka Yamada, and Willis B. Person. 30 Mar 65, 8p. Contract DA-ARO (D)-31-124-G387, AROD 1733:21

Unclassified report

Descriptors: (*Metal carbonyls, Organic sulfur compounds), (*Absorption spectrum, Metal carbonyls), (*Infrared spectroscopy, Metal carbonyls), Molecular spectroscopy, Spectra (Infrared), Crystals, Solids, Films Gases, Molecular association

Absolute infrared intensities for the fundamental absorption bands of COS have been measured in polycrystalline solid films. The path length has been measured by observing interference fringes. The results are in fair agreement with the intensities computed from the gasphase values, corrected for the simple 'field effect,' except for the very weak band, nu (2). These results, together with those reported earlier for other linear triatomic molecules, are examined critically in a search for patterns of behavior. The 'intensity sum rule' for crystals is restated. It is concluded that the spectra of these crystals are good examples of those to be expected for weak 'chemical' interactions. (Author)

AD-629 465 Fld. 7/4
IOWA UNIV IOWA CITY DEPT OF CHEMISTRY
ABSOLUTE INFRARED INTENSITIES IN MIXED HYDROGEN HALIDE CRYSTALS,
by H. Bruce Friedrich, Haruka Yamada, and Willis B. Person. 14 Jul 65, 2p. Contract DA-ARO (D)-31-124-G387, AROD 1733:23

Unclassified report

Availability: Published in Journal of Chemical Physics v43 n11 p4180-1 Dec 1 1965. Copies to DDC users only.

Descriptors: (*Infrared spectroscopy, Halides), (*Hydrogen compounds, Halides), Deuterated compounds, Hydrochloric acid, Crystals, Bromides, Chemical bonds

Although the uncertainties in the concentrations of the mixed crystals result in larger errors than for the pure -crystal measurements, results indicate that the intensity of HCl isolated in HBr may be higher than that of pure HCl. Within experimental error the intensity of DBr is found to be half that of HBr and suggests that the D bonding in crystalline DBr is quite similar to the H bonding in HBr and that any other factors do not affect the intensities to an appreciable extent. It is clear that the static environment is almost entirely responsible for the intensity changes in the hydrogen halide crystals and that resonant interactions produce very little if any of the observed intensification.

AD-629 467 Fld. 7/4, 7/3
UTAH STATE UNIV LOGAN DEPT OF CHEMISTRY
THE HEAT OF COMBUSTION AND STRAIN ENERGY OF 2,2-PARACYCLOPHANE,
by R. H. Boyd. 17 Jun 65, 5p. Contract DA-ARO (D)-31-124-G430, AROD 4150:2

Unclassified report

Availability: Published in Tetrahedron v22 p119-22 1966. Copies to DDC users only.

Descriptors: (*Polycyclic compounds, Chemical bonds), (*Chemical bonds, Thermochemistry), Heat of combustion, Heat of formation, Vapor pressure, Stereochemistry, Aromatic compounds, Thermodynamics

The heat of combustion and vapor pressure curve of solid 2,2-paracyclophane was determined and used to derive the heats of combustion and formation of both the solid and gaseous compound. Comparison of the experimental heat of formation with that expected for an unstrained reference structure indicates a strain energy of 31 kcal/mole. The division of the strain energy among several contributions is discussed. (Author)

AD-629 472 Fld. 7/4, 20/4
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
UNSTEADY STATE DESTRUCTION OF GLASS-LIKE MATERIALS IN A SUPERSONIC GAS,
by B. I. Reznikov. 1 Feb 66, 19p. Rept. no. FTD-TT-65-1608, TT 66-60732

Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n6 p69-76 1964.

Descriptors: (*Ablation, Supersonic flow), (*Glass, Ablation), Solids, Sublimation, High-temperature research, Surface temperatures, Materials, USSR

An approximate analytical solution was obtained for the problem of unsteady destruction of homogeneous glass-like materials in the region of the critical point (line) at constant (or slightly changing) conditions in the external flow. There is a clear expression for the rate of destruction of a material and the dependence of the surface temperature on time in the form of a quadrature. It was shown that the rate of destruction is determined by the surface temperature of the material and barely depends upon the rate of heating the surface. For comparatively low surface temperatures up to 2300K there is a 'sublimation' character of destruction (the degree of gasification is close to one) and removal does not occur in the liquid

phase. The results of theoretical calculations are compared with experiments. (Author)

AD-629 480 Fld. 7/4, 11/6
CFSTI Prices: HC $3.00 MF $0.75
CORNELL UNIV ITHACA N Y DEPT OF ENGINEERING PHYSICS
A GENERALIZED MODEL FOR THE CHEMISORPTION BEHAVIOR OF NITROGEN ON TUNGSTEN.
Technical rept.,
by William K. Warburton. 1 Mar 66, 88p. Rept. no. TR-9,
Contract Nonr-401 (31) Proj. NR-036-035,
Unclassified report

Descriptors: (*Chemisorption, Nitrogen), (*Nitrogen, Chemisorption), (*Tungsten, Chemisorption), Surface properties, Adsorption, Atomic properties, Atomic energy levels, Kinetic theory, Kinetic energy, Hydrogen, Crystal structure, Single crystals, Mathematical models, Gases

A model to describe the chemisorption of beta-nitrogen on tungsten is discussed. It is based on the following assumptions; the binding is atomic, the energy is dissipated upon molecular desorption, the adsorption rate depends on heat of surface diffusion, the surface potential depends on the height of adatoms and an equilibrium concentration of molecular complexes is maintained on the surface during adsorption. The primary result of this model is the quantitative prediction of the existence of molecular complexes, formed at high temperatures as a result of collisions between the nitrogen adatoms. This explanation is shown to be consistent with much of the published adsorption data of the nitrogen adatom adsorption's effects on the various tungsten planes' surface potentials and their temperature variations. (Author)

AD-629 483 Fld. 7/4, 11/6, 20/12
CFSTI Prices: HC $3.60 MF $0.50
CARNEGIE INST OF TECH PITTSBURGH PA
THE ADSORPTION OF SULFUR ON COPPER.
Technical rept.,
by H. E. Collins, and P. G. Shewmon. 1 Mar 66, 31p. Rept. no. TR-2,
Contract Nonr-760 (19) Proj. NR-031-676,
Unclassified report

Descriptors: (*Copper, Adsorption), (*Sulfur, Adsorption), Grain boundaries, Test methods, Surface properties

A study was made to determine the sites at which sulfur adsorption occurs on copper surfaces. Measurements were made of the relative torques, tau/gamma sub s at the intersection of twin boundaries with surfaces near the three low index orientation, i.e., (100), (110), and (111), over a range of H2S/H2 ratios. H2S concentrations from 3 to 1500 ppm between 830 and 1050C were used. It is concluded that sulfur adsorption occurred perferentially though not exclusively at edge sites near the (100) and (110) surfaces in the H2S range < or = 700 ppm giving rise to negative torques near these orientations. Beyond this H2S range, adsorption occurred at all sites. Near the (111) surface tau/gamma sub s varied little with H2S concentration up to approximately 75 ppm. Above this range, the results indicated that adsorption is occurring on both terrance and edge sites. (Author)

AD-629 498 Fld. 7/4
TEXAS UNIV AUSTIN DEPT OF CHEMISTRY
SUBSTITUENT EFFECTS. V. FURTHER EVIDENCE CONCERNING THE NATURE OF THE INDUCTIVE EFFECT,
by Michael J. S. Dewar, and Alan P. Marchand. 29 Jul 65, 6p. Contract DA-ARO (D)-31-124-G-496,
AROD 4388:1
Unclassified report

Availability: Published in Journal of the American Chemical Society v88 p354-8 1966. Copies to DDC users only.

Descriptors: (*Organic compounds, Theory), Chemical bonds, Spectra (Visible + ultraviolet), Absorption spectrum, Fluorine compounds, Pyridines, Toluenes, Ammonium compounds, Ions, Aliphatic compounds, Nuclear magnetic resonance, Polarization

The ultraviolet absorption spectra of m- and p-aminophenyltrimethylammonium ions, of m- and p-trifluoromethylaniline, and of beta- and gamma-aminopyridine have been compared with that of aniline; the results suggest that the 'inductive' substituent CF3 operates mainly by a field effect rather than by a pi-inductive effect. This conclusion was also supported by comparisons of the proton n.m.r. spectra of p-tolyl- and p-methylbenzyltrimethylammonium ions, of p-trifluoromethyltoluene, and of gamma-picoline in various solvents. (Author)

AD-629 504 Fld. 7/4, 20/3, 20/12
BRUSSELS UNIV (BELGIUM)
STATISTICAL MECHANICS OF FERROMAGNETISM,
by Robert Brout. 1965, 63p. Contract AF-EOAR-51-63, Proj. AF-9767 Task 976701,
AFOSR 65-2169
Unclassified report

Availability: Published in Magnetism v2A p43-102 1965. Copies to DDC users only.

Descriptors: (*Statistical mechanics, Ferromagnetism), (*Ferromagnetism, Statistical mechanics), Model theory, Band theory of solids, Phase studies, Belgium

AD-629 507 Fld. 7/4
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
DYNAMIC NUCLEAR POLARIZATION BY ASPHALTENE RADICALS: EFFECTS OF COLLOID SIZE AND SOLVENT DIFFUSION,
by Edward H. Poindexter. 15 Jul 65, 7p.
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n10 pt1 p3587-92 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Asphalt, Colloids), (*Polarization, Protons), Benzenes, Dipole moments, Electrons, Organic solvents, Nuclear magnetic resonance, Relaxation time, Magnetic fields, Free radicals, Electron transitions

Dynamic proton polarization in colloidal asphalt solutions arises from electron-proton dipolar coupling. At 75 G, the dipolar interaction is modulated by colloidtumbling motions and solvent-molecular diffusion. The NMR signal enhancement declines much more slowly with increasing magnetic field than would be predicted from a single correlation time appropriate to colloid tumbling. The observed decline suggests a dual-motion model in which radical tumbling controls the low-frequency transitions, and solvent diffusion controls the high-frequency transitions. The low-frequency transitions dominate proton relaxation. The enhancement and proton relaxation rate are observed to vary by more than an order of magnitude in a series of monoalkylbenzene solutions with a viscosity range of five to one. Enhancement declines with colloid flocculation in less-effective solvents; relaxation rate increases. In all cases, the individual low- and high-frequency transition rates are in accord with the dual-motion model. (Author)

AD-629 531 Fld. 7/4, 20/1
IOWA ENGINEERING EXPERIMENT STATION AMES
SOUND DISPERSION IN BINARY MIXTURES OF HALOMETHANE GASES,
by R. R. Boade, and Sam Legvold. 6 Aug 64, 7p.
Contract AF-AFOSR-62-319,
AFOSR 65-2779
Unclassified report

Availability: Published in The Journal of Chemical Physics v42 n2 p569-73 Jan 15 1965. Copies to DDC users only.

Descriptors: (*Halogenated hydrocarbons, Acoustic properties), (*Ultrasonic radiation, Scattering), Chlorine compounds, Fluorine compounds, Methane, Mixtures, Relaxation time, Equations, Specific heat, Potential theory, Gases

Sound dispersion was experimentally examined in all binary combinations of the halomethane gases, CH2F2, CHF3, CF4, CCl2F2, and CHCl2F. Concentrations of 25%, 50%, and 75% were examined in each combination. A single relaxation time was observed in all the mixtures, and the Calvert-Amme equation was found to be valid when the relaxation times of the individual gases in the mixture were similar and when their vibrational specific heats were similar.

AD-629 612 Fld. 7/4
GUGGENHEIM JET PROPULSION CENTER CALIF INST OF TECH PASADENA
ABSOLUTE INTENSITY MEASUREMENTS FOR THE 2.7 MICRON BAND OF WATER VAPOR IN A SHOCK TUBE,
by R. W. Patch. 1964, 31p. Contract AF-AFOSR-71-63,
AFOSR 65-2488
Unclassified report

Prepared in cooperation with California Inst. of Tech., Pasadena. Hydrodynamics Lab.

Availability: Published in Journal of Quantitative Spectroscopy and Radiative Transfer v5 p137-64 1965. Copies to DDC users only.

Descriptors: (*Water vapor, Band spectrum), (*Band spectrum, Intensity), (*Infrared spectroscopy, Water vapor), Shock tubes, Absorption spectrum, Argon, Emissivity, Spectrum signatures

The apparent spectral absorption coefficients of the H2O infrared bands in the vicinity of 2.7 microns were measured in a shock tube behind reflected shock waves in an Ar-H2O mixture. By interrupting an infrared beam at a 60 kc rate and projecting this beam across the shock tube to a monochromator, it was possible to measure simultaneously both emission and absorption of H2O at 1000K. The spectral absorption coefficients obtained from emission measurements averaged 9.8 per cent higher than absorption coefficients obtained from absorption measurements, probably due to experimental errors (smaller than usually encountered in shock tube measurements). At 1933K experimental difficulties precluded simultaneous measurement of infrared emission and absorption, so measurements were restricted to emission. The apparent absorption coefficients were integrated to give the integrated absorption coefficients for the collection of bands near 2.7 micron. Integrated absorption coefficients were 49.8 cm to the -2 power/atm, 54.7 to the -2 power cm/atm, and 31.6 to the -2 power cm/atm for absorption at 1000K, emission at 1000K, and emission at 1933K, respectively. The two values at 1000 K were in good agreement with those of Goldstein, who made no measurements above this temperature. (Author)

AD-629 613 Fld. 7/4
MELLON INST PITTSBURGH PA
INTENSITY DISTRIBUTION IN THE ELECTRON-IMPACT SPECTRUM OF CARBON MONOXIDE AT HIGH-RESOLUTION AND SMALL SCATTERING ANGLES,
by Vincent D. Meyer, Ausma Skerbele, and

Edwin N. Lassettre. 22 Mar 65, 14p. Contract AF-AFOSR-61-63, AFOSR 65-2867

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n3 p805-16 Aug 1 1965. Copies to DDC users only.

Descriptors: (*Carbon monoxide, Electron bombardment), (*Spectrum analyzers, Electron beams), (*Electron beams, Scattering), Scattering, Intensity, Band spectrum, Chemical bonds, Vibration, Electron transitions, Spectra (Visible + ultraviolet)

An electron spectrometer, which provides velocity selection before scattering, is described; and the results of a study of relative intensities in the carbon monoxide spectrum are reported. The vibrational levels of the fourth positive band system have been resolved and relative intensities determined for the first nine. The relative intensities are compared with calculated Franck-Condon factors. The agreement is good at low vibrational quantum numbers but noticeable discrepancies are found for high-vibrational levels. The problem of calculating relative oscillator strengths from a fully resolved spectrum is considered and applied to data obtained in the present research. Relative oscillator strengths are compared with those obtained previously from unresolved spectra. If the Born approximation is valid, then the electron-impact and ultraviolet absorption spectra should be closely similar. This is actually observed for most of the spectrum but the transition at 12.79 V is an outstanding exception. The relative oscillator strength obtained from the electronimpact spectrum exceeds that from the ultraviolet absorption spectrum by almost a factor of 3. The reason for this anomaly is not known. (Author)

AD-629 614 Fld. 7/4, 7/3
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF CHEMISTRY
CALIBRATION OF THE GLASS ELECTRODE IN ACETONITRILE. SHAPE OF POTENTIOMETRIC TITRATION CURVES. DISSOCIATION CONSTANT OF PICRIC ACID,
by I. M. Kolthoff, and M. K. Chantooni,Jr.. 28 Jun 65, 11p. Contract AF-AFOSR-28-63, AFOSR 66-0045

Unclassified report

Availability: Published in Journal of the American Chemical Society v87 n20 p4428-36 Oct 20 1965. Copies to DDC users only.

Descriptors: (*Acetonitriles, Electrochemistry), (*Electrodes, Calibration), (*Volumetric analysis, Acetonitriles), (*Nitrophenols, Dissociation), Acid-base equilibrium, Equations, Ammonium compounds, Hydroxides, Neutralization, Buffers (Chemistry), Sulfonic acids, Chlorine compounds, Perchloric acid, Benzenes, Organic nitrogen compounds

An equation was derived for the calculation of paH in the neutralization with tetraalkylammonium hydroxide in acetonitrile of a weak acid with known dissociation constant KHA and homoconjugation constant KHA2 (-). The assumption was made that the tetraalkylammonium salts of the acid are completely dissociated. At 50% neutralization paH = pKHA. When the product of initial acid concentration and KHA2 (-) is greater than about 10, the buffer capacity has a pronounced minimum at 50% neutralization. Equations are derived to calculate KHA and KHA2 (-) from paH, measured with the glass electrode in mixtures of an acid and its tetraalkylammonium salt. pKHA and pK2 (HA) of methanesulfonic acid (I) and 2,5-dichlorobenzenesulfonic acid (II) were determined by various methods and the following values were found: 10.0 and 3.8 for I and 6.2 and 2.65 for II, respectively. The glass electrode in AN was calibrated in mixtures of I and of II with their tetraethylammonium salts and in mixtures of o-nitroaniline and perchloric acid. pKHA of picric acid was determined potentiometrically and a value of 11.0 plus or minus 0.1 was found. (Author)

AD-629 651 Fld. 7/4
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
VISCOSITY MEASUREMENTS ON FUSED SALTS. PART 2. SOME ALKALI AND ALKALINE EARTH CHLORIDES,
by R. D. Reeves, and G. J. Janz. 29 Mar 65, 9p. Contract AF-AFOSR-181-63, Proj. AF-9710, Task 971001, AFOSR 65-2366

Unclassified report

See also AD-629 652.

Availability: Published in Transactions of the Faraday Society v61 n514 pt10 p2305-11 Oct 1965. Copies to DDC users only.

Descriptors: (*Salts, Viscosity), (*Viscosity, Measurement), (*Alkali metal compounds, Viscosity), (*Alkaline earth compounds, Viscosity), Chlorides, Laboratory equipment, Oscillation, Calcium compounds, Strontium compounds, Barium compounds, Rubidium compounds, Cesium compounds, Fluid flow

Viscosity measurements by the oscillation hollow cylinder method were carried out at temperatures in the range 650-1050C on the chlorides of calcium, strontium, barium, rubidium and cesium. The results are discussed in the light of current views on viscous flow in ionic liquids. (Author)

AD-629 652 Fld. 7/4, 14/2
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
VISCOSITY MEASUREMENTS ON FUSED SALTS. PART 1. THEORETICAL PRINCIPLES OF THE OSCILLATING HOLLOW CYLINDER METHOD,
by Roger D. Reeves, and George J. Janz. 29 Mar 65, 8p. Contract AF-AFOSR-181-63, Proj. AF-9710, Task 971001, AFOSR 65-2365

Unclassified report

Availability: Published in Transactions of the Faraday Society v61 n514 pt10 p2300-4 Oct 1965. Copies to DDC users only.

Descriptors: (*Salts, Viscosity), (*Viscosity, Measurement), (*Laboratory equipment, Theory), Cylindrical bodies, Oscillation, Equations, Design

The mathematical treatment of the motion of a system consisting of an oscillating hollow cylinder containing a liquid is examined. It leads to a cubic equation in the square root of the viscosity of a form suitable for absolute calculations. The conditions under which this reduces to the forms of the various known empirical and semi-empirical equations for calculating viscosity from the logarithmic decrement of the amplitudes are examined, and the factors for the design of an apparatus suitable for unambiguous results are discussed. (Author)

AD-629 656 Fld. 7/4, 7/2, 20/8
PITTSBURGH UNIV PA DEPT OF PHYSICS
MEASUREMENT BY NMR OF THE DIFFUSION RATE OF HF IN ICE,
by Marcel Kopp, Dennis E. Barnaal, and Irving J. Lowe. 21 Jun 65, 9p. Contract AF-AFOSR-196-63, Proj. AF-9761, Task 976101, AFOSR 66-0234

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n9 p2965-71 1 Nov 1965. Copies to DDC users only.

Descriptors: (*Ice, Diffusion), (*Fluorine, Diffusion), Concentration (Chemistry), Measurement, Hydrogen compounds, Fluorides, Nuclear magnetic resonance, Protons, Relaxation time

An experiment is described by which the diffusion of fluorine in monocrystalline ice cylinders is followed quasicontinuously, using the proton magnetic resonace spin -lattice relaxation time to measure the HF concentration along the sample. The diffusion coefficient D was evaluated for various temperatures between -30 and -4C. The results show more scatter than the experimental error can account for. A least-squares fit of data yields D (-10C) =0.0000008 sq cm/sec for the diffusivity and E=0.58 eV=13.4 kcal/mole for the activation energy, with root-mean-square deviations of 0.0000005 sq cm/sec and 0.08 eV, respectively. The highest concentration of diffused HF which can be absorbed by monocrystalline ice is about 0.00004 HF/H2O. A possible explanation is offered for the large value and dispersion of the diffusivity. (Author)

AD-629 663 Fld. 7/4, 7/2
ALABAMA UNIV UNIVERSITY DEPT OF PHYSICS
ESR OF X-IRRADIATED SILVER NITRATE,
by W. C. Mosley, and W. G. Moulton. 11 Dec 64, 10p. Contract AF-AFOSR-288-63, Proj. AF-9763, Task 976303, AFOSR 65-2591

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n4 p1207-14 Aug 15 1965. Copies to DDC users only.

Descriptors: (*Electron spin resonance, Silver compounds), (*Silver compounds, Nitrates), Line spectrum, Paramagnetic materials, Single crystals, Theory, Ions, Low-temperature research

Four paramagnetic species were detected by ESR in single crystals of AgNO3 x irradiated at 77K. The principal values and corresponding principal axes of the g tensors and hyperfine tensors have been determined. An eight-line spectrum, four doublets, is due to Ag (++). A 24-line spectrum, four sextets, has been assigned to a species believed to be AgNO3 (-). A spectrum of four triplets characteristic of stationary NO2 molecules was observed in previously irradiated crystals and crystals doped with AgNO2. A spectrum consisting of two weak singlets is due to an unidentified species. This is the only species stable at room temperature. Discussions of the orientations, configurations, mechanisms for production, and annealing characteristics of the several species are given. (Author)

AD-629 665 Fld. 7/4, 4/1
CANTERBURY UNIV CHRISTCHURCH (NEW ZEALAND) DEPT OF CHEMISTRY
MASS-SPECTROMETRIC STUDIES OF ATOMIC REACTIONS. V. THE REACTION OF NITROGEN ATOMS WITH NO2,
by L. F. Phillips, and H. I. Schiff. 18 Dec 64, 6p. Contract AF-AFOSR-264-63, AFOSR 65-2383

Unclassified report

Prepared in cooperation with McGill Univ., Montreal (Quebec). Upper Atmosphere Chemistry Group.

Availability: Published in The Journal of Chemical Physics v42 n9 p3171-4 May 1 1965. Copies to DDC users only.

Descriptors: (*Nitrogen, Chemical reactions), (*Mass spectroscopy, Nitrogen), Atoms, Nitrogen compounds, Dioxide, Upper atmosphere, Reaction kinetics, Photometric analysis, Gas flow, New Zealand, Canada

The reaction of N atoms with NO2 was studied in a fast flow system, using a mass spectrometer to monitor the composition of the reaction mixture. The rate constant for removal of NO2 by N was found. By a combined mass-spectrometric and photometric method the relative contributions of the different primary reactions were determined as follows (errors shown are standard deviations):

N+NO2 yields N2O+O (0.43 plus or minus 0.04); N+NO2 yields 2NO (0.33 plus or minus 0.07); N+NO2 yields N2+O2 (0.10 plus or minus 0.12); N+NO2 yields N2+2O (0.13 plus or minus 0.11). (Author)

AD-629 715 Fld. 7/4, 20/6
IIT RESEARCH INST CHICAGO ILL TECHNOLOGY CENTER
INFRARED PROPERTIES OF NIO AND COO AND THEIR MIXED CRYSTALS.
Physical sciences research papers,
by P. J. Gielisse, J. N. Plendl, R. Marshall, S. S. Mitra, and R. Mykolajewycz. 4 Dec 64, 13p.
Contract AF 19(628)-2418,
AFCRL 65-882 ,AFCRL PSRP-178
Unclassified report

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Lab. for Insulation Research. Contract AF 19 (628)-395. See also AD-626 595.

Availability: Published in Journal of Applied Physics v36 n8 p2446-50 Aug 1965. Copies to DDC users only.

Descriptors: (*Infrared spectroscopy, Oxides), (*Nickel compounds, Oxides), (*Cobalt compounds, Oxides), Single crystals, Crystals, Solid solutions, Refractive index, Dielectric properties, Electrical properties, Optical properties

The room-temperature reststrahlen spectra of flame grown NiO and CoO, as well as those of three intermediate members of this solid solution series, are presented. A full Kramers-Kronig analysis on all members has been performed and checked with damped oscillator calculations. The resulting refractive indices, extinction coefficients, dielectric constants, effective ionic charges (Sziget q*), and characteristic frequencies are presented along with the lattice constants and are discussed in the light of their interrelation. (Author)

AD-629 747 Fld. 7/4, 11/9, 7/3
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF APPLIED CHEMISTRY
PROTON MAGNETIC RESONANCE LINE WIDTH AS A FUNCTION OF POLYMER TACTICITY,
by S. Brownstein, and D. M. Wiles. 6 Aug 65, 5p.
NRC 8705
Unclassified report

Availability: Published in Canadian Journal of Chemistry v44 p153-6 1966. Copies to DDC users only.

Descriptors: (*Polymers, Nuclear magnetic resonance), (*Acrylic resins, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Polymers), (*Stereochemistry, Acrylic resins), Microwave spectroscopy, Absorption spectrum, Solutions, Viscosity, Nuclear spins, Canada

The high resolution proton magnetic resonance spectra of five samples of poly (methyl methacrylate) in chloroform solution were measured with 100 Mc/s equipment The widths of the absorption lines arising from the protons of the alpha methyl and the methoxyl groups were compared. The widths are greater when the polymer is predominantly syndiotactic than when it is predominantly isotactic. It is concluded that isotactic samples have the more extended conformation in chloroform solution. An analogy with dilute solution viscosity measurements is outlined in support of this conclusion. Differences between the widths of the lines of the methylene protons in a completely isotactic poly (methyl methacrylate) sample are attributed to long range spin coupling. (Author)

AD-628 892 See Fld. 6/5

AD-628 922 See Fld. 20/10

AD-628 923 See Fld. 7/2

AD-629 013 See Fld. 11/7

AD-629 030 See Fld. 20/6

AD-629 064 See Fld. 4/1

AD-629 065 See Fld. 7/5

AD-629 068 See Fld. 11/6

AD-629 091 See Fld. 20/10

AD-629 174 See Fld. 20/12

AD-629 179 See Fld. 20/11

AD-629 236 See Fld. 20/8

AD-629 282 See Fld. 6/1

AD-629 398 See Fld. 20/10

AD-629 429 See Fld. 20/12

AD-629 437 See Fld. 3/2

AD-629 479 See Fld. 7/5

AD-629 481 See Fld. 20/2

AD-629 551 See Fld. 7/2

AD-629 552 See Fld. 7/2

AD-629 553 See Fld. 7/3

AD-629 658 See Fld. 20/12

AD-629 659 See Fld. 20/12

AD-629 660 See Fld. 20/12

AD-629 661 See Fld. 20/12

AD-629 671 See Fld. 7/5

AD-629 702 See Fld. 20/12

AD-629 748 See Fld. 7/3

AD-629 750 See Fld. 7/3

AD-629 751 See Fld. 7/3

7/5. RADIO AND RADIATION CHEMISTRY

AD-629 065 Fld. 7/5, 20/6, 7/4
WINDSOR UNIV (ONTARIO) DEPT OF PHYSICS
SENSITIZED FLUORESCENCE IN VAPORS OF ALKALI METALS. III. ENERGY TRANSFER IN CESIUM-CESIUM COLLISIONS,
by M. Czajkowski, and L. Krause. 11 Mar 65, 12p. Contract AF-AFOSR-361-63,
AFOSR 65-2819
Unclassified report

Availability: Published in Canadian Journal of Physics v43 p1259-68 Jul 1965. Copies to DDC users only.

Descriptors: (*Fluorescence, Alkali metals), (*Alkali metals, Fluorescence), (*Cesium, Fluorescence), (*Atomic energy levels, Cesium), Transport properties, Vapors, Photomultipliers, Probability, Vapor pressure, Canada

Collisions of the second kind leading to the transfer of excitation between 6 (2)P1/2 and 6 (2)P3/2 states in cesium were investigated by studying sensitized fluorescence in cesium vapor at pressures in the range 0.000002 -6 to -5 0.00007 mm Hg, which were not accessible previously to such experiments and at which trapping of resonance radiation is virtually absent. The use of an improved fluorescence tube and of high-resolution interference filters in conjunction with a liquid-air-cooled photomultipler tube permitted accurate measurements of extremely low fluorescent light intensities. (Author)

AD-629 086 Fld. 7/5
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA) DEPT OF NUCLEAR AND RADIATION CHEMISTRY
A THIRD POSITRON LIFETIME IN SOLID POLYMERS,
Revised ed.,
by S. J. Tao, and J. H. Green. 29 Sep 64, 6p.
Contract AF-AFOSR-62-398,
AFOSR 65-2826
Unclassified report

Revision of manuscript submitted 29 Jul 64.

Availability: Published in Proceedings of the Physical Society, v85 p463-7 1965. Copies to DDC users only.

Descriptors: (*Polymers, Positrons), (*Positrons, Life expectancy), Annihilation reactions, Heat treatment, Halocarbon plastics, Polyethylene plastics, Waxes, Nylon, Propenes, Radiation chemistry

Positron lifetimes have been measured in Teflon (P.T.F.E.), polyethylene, nylon-6, polypropylene and paraffin wax. Using equipment of good resolution, W sub 1/2 = 0.7 nsec, wide range, 30 nsec, and a highly linear response, three components of the lifetimes are found in each case. These are about 0.3 nsec, 0.6-1.1 nsec and 1.7-4.1 nsec. Two components only have been reported so far. A connection is found between the observed intensities of the longer components and the degree of crystallinity of the polymers, and an explanation is offered. The intensities of the long components vary according to the previous heat treatment of the polymer, especially in Teflon, in a way which depends on the physical structure of the solid. The identification of the three components should permit a useful re-examination of positron lifetimes in 'molecular materials'. (Author)

AD-629 160 Fld. 7/5
TRG INC MELVILLE N Y
PHOTODISSOCIATION OF THALLIUM BROMIDE AND CESIUM BROMIDE,
by W. T. Walter, and S. M. Jarrett. 1965, 5p.
Contract AF 49 (638)-673,
AFOSR 65-2809
Unclassified report

Availability: Published in Applied Optics Supplement 2 of Chemical Lasers, p201-4 1965. Copies to DDC users only.

Descriptors: (*Bromides, Photolysis), (*Thallium compounds, Photolysis), (*Cesium compounds, Photolysis), Dissociation, Lasers, Optical phenomena

Photodissociation of T1Br and CsBr by the 1850-A mercury resonance line could lead to laser transitions at 5350 A and 2.93 mu in T1 and Cs, respectively. The transition probabilities of Cs are such that radiative decay will maintain a population inversion between the 7 2P3/2 and 7 2S1/2 levels. Calculations indicate that a gain of 4% per m is expected at a temperature of 890C for photodissociation into the 7 2P3/2,1/2Cs levels. In T1, however, the 6 2P3/2 level is metastable. A suitable quenching gas must be found before oscillation is possible at 5350 A from photodissociation into the 7 2S1/2 level. Nitrogen and CO2 were tried thus far without success. (Author)

AD-629 378 Fld. 7/5, 20/8
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF CHEMISTRY
RARE GAS ION REACTIONS WITH AMMONIA,
by G. R. Hertel, and W. S. Koski. 12 Nov 63, 5p.

Contract AF 49 (638)-1301, Proj. AF-9760
Task 976002,
AFOSR 65-0304

Unclassified report

Availability: Published in Journal of the American Chemical Society v86 p1683-5 1964. Copies to DDC users only.

Descriptors: (*Helium group gases, Ions), (*Ammonia, Radiation chemistry), (*Hydrazine, Production), Ionization potentials, Molecular energy levels, Nuclear cross sections, Nuclear reactions, Deuterons, Krypton, Neon, Zenon

The fractional yields and the relative cross sections for rare gas ion reactions with ammonia have been determined for the 3 to 200 e.v. energy region. The results are in rough agreement with the Massey-Burhop theory ('Electronic and Ionic Impact Phenomena', Oxford Univ. Press, N. Y., 1952, p.478); however, anomalies are present. The implication of these results is discussed with respect to the recently proposed mechanism for rare gas sensitization for the production of hydrazine in the gas phase radiolysis of ammonia (F. W. Lampe, W. S. Koski, E. R. Weiner and W. H. Johnston. 'Intern. J. Appl. Radiation Isotopes', 14:231, (1963)). (Author)

AD-629 478 Fld. 7/5
CFSTI Prices: HC $5.00 MF $1.00
NORTHEASTERN UNIV BOSTON MASS PHOTOCHEMISTRY AND SPECTROSCOPY LAB
A KINETIC STUDY OF THE PHOTOCHEMICAL ADDITION OF PHENANTHRENEQUINONE TO OLEFINS.
Scientific rept.,
by James J. Bohning. Jul 65, 151p. Rept. no. Scientific-1,
Contract AF 19 (628)-3836, Proj. AF-8659,
Task 865901,
AFCRL 65-714

Unclassified report

Descriptors: (*Quinones, Photochemistry), Molecular isomerism, Energy conversion, Acomatic compounds, Dynamics

A detailed kinetic study of the photochemical addition of phenanthrenequinone to olefins has been made using an apparatus which permits the simultaneous measurement of quantum yields and the rate of disappearance of the activated species. The mechanism formulated from the kinetic data predicts the observed linear relationship between the log ((Io/I) - 1) and time (Io = incident light intensity, I = transmitted light intensity). Further, the quantum yield is independent of olefin concentration but is dependent on the nature of the olefin as well as on the initial ratio of cis-trans isomers. Additional kinetic results include the absence of quenching by oxygen at high olefin-phenanthrenequinone ratios, a small secondary deuterium isotope effect in the rate of addition, and the lack of quenching by the adduct and by two known triplet quenchers. In the stilbene system sensitized cis-trans isomerization occurs with the eventual attainment of an equilibrium cis-trans ratio. Both isomers give the identical adduct. Intersystem crossing of excited quinone appears to be very efficient, but the rates of triplet energy transfer to the cis and trans stilbenes are not equal. (Author)

AD-629 479 Fld. 7/5, 7/4
CFSTI Prices: HC $6.00 MF $1.25
NORTHEASTERN UNIV BOSTON MASS PHOTOCHEMISTRY AND SPECTROSCOPY LAB
AN INVESTIGATION OF PHOTOCHEMICALLY GENERATED FREE RADICALS FROM PERINAPHTHENONES.
Scientific rept.,
by Gary P. Rabold. Jul 65, 217p. Rept. no. Scientific-2,
Contract AF 19 (628)-3836, Proj. AF-8659,
Task 865901,
AFCRL 65-715

Unclassified report

Descriptors: (*Free radicals, Photochemistry), Ketones, Electron spin resonance, Molecular orbitals, Hydrogen, Hydroxides, Organic solvents, Aromatic compounds

AD-629 489 Fld. 7/5
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
PHOTOREACTIVE STATE OF ACRIDINE IN SOLUTION,
by Arlette Kellmann, and Jean T. Dubois. 16 Nov 64, 9p. Rept. no. ARL-65-206,
Proj. AF-7023, Task 702300,

Unclassified report

Prepared in cooperation with Paris Univ. (France) Laboratoire de Chimie Physique.

Availability: Published in The Journal of Chemical Physics v42 n7 p2518-22 Apr 1 1965. Copies to DDC users only.

Descriptors: (*Acridines, Photochemistry), (*Atomic energy levels, Acridines), (*Fluorescence, Acridines), Chemical reactions, Polycyclic compounds, Anthracines, N-heterocyclic compounds, Reaction kinetics, France

The technique of energy transfer was used in an attempt to establish the photoreactive state of acridine in solution. It is shown that the lowest-lying triplet of acridine, the pi-pi* triplet, is not the reactive species and that the reaction originates, at least in part, through the n-pi* triplet. In the course of this work, the transfer of triplet-state energy from biacetyl to acridine, phenazine, anthracene, 1,2-benzanthracene, pyrene, 1,2-benzpyrene and 3,4-benzpyrene was studied by an intensity method. (Author)

AD-629 671 Fld. 7/5, 7/4
CFSTI Prices: HC $1.60 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
METHODS OF SPECTRAL ANALYSIS. GENERAL INFORMATION ON LUMINESCENCE AND ITS ANALYSIS.
by V. L. Levshin. 1966, 17p. Rept. no. Translation-2073,
TT 66-60743

Unclassified report

Trans. of mono. Metody Spektralnogo Analiza, Moscow, 1962 p406-16.

Descriptors: (*Luminescence, Spectroscopy), Electron transitions, Analysis, Absorption spectrum, Polarization, Molecular energy levels, Excitation, Thermal radiation, USSR

Contents: Basic phenomena of luminescence and their use in the analysis: Basic rules concerning radiance, and their use in analysis of luminescence; Types of luminescence analysis and its peculiarities.

AD-628 905 See Fld. 6/1

AD-629 266 See Fld. 20/12

AD-629 660 See Fld. 20/12

Field 8-EARTH SCIENCES AND OCEANOGRAPHY

8/1. BIOLOGICAL OCEANOGRAPHY

AD-628 965 Fld. 8/1, 20/1
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
MIGRANT SOUND SCATTERERS: INTERACTION WITH THE SEA FLOOR,
by John D. Isaacs, and Richard A. Schwartzlose. 5 Oct 65, 5p. Contract Nonr-2216 (23), Proj. NR-083-005,

Unclassified report

Availability: Published in Science v150 n3701 p1810-13 Dec 31, 1965. Copies to DDC users only.

Descriptors: (*Plankton, Ocean bottom), (*Ecology, Plankton), Marine biology, Underwater sound, Scattering, California, Seacoast

Studies on the coast of Baja California show that oceanic zooplankters carried into shallow water provide abundant food for resident predators. The vertically migrating zooplankters apparently are vulnerable when they encounter the sea floor in shoal areas. This ecologically significant mechanism may be of importance to fisheries and military operations. (Author)

AD-629 707 See Fld. 6/20

8/2. CARTOGRAPHY

AD-629 628 Fld. 8/2, 12/2, 8/5
CFSTI Prices: HC $13.60 MF $1.00
BROWN (D) ASSOCIATES INC EAU GALLIE FLA
MATHEMATICAL TARGETING II: THE ANALYSIS OF ANALYTICAL AEROTRIANGULATION TECHNIQUES BY SIMULATION METHODS.
Final rept.,
by Ronald G. Davis, Frederick C. Johnson, and Maurice S. Gyer. Feb 66, 135p. Contract AF 30 (602)-3404, Proj. AF-5569, Task 556902,
RADC TR-65-418

Unclassified report

See also AD-609 069.

Descriptors: (*Mathematical models, Photogrammetry), (*Photogrammetry, Aerial photography), Aerial reconnaissance, Geodesics, Simulation, Programming (Computers), Target position indicators

The problem of applying analytical block aerotriangulation techniques to targeting is studied by means of simulation methods. Photographic clocks of various configurations are adjusted and the resulting errors tabulated, graphed, and analyzed. The results of the study indicate that simulation methods are a powerful tool for analyzing the effectiveness of various photographic block configurations for the determination of the positions and elevations of ground targets. An operational set of electronic computer programs for performing either simulation or actual rigorous analytical adjustment of medium-sized (up to 32 photographs) blocks of metric aerial photography, on the CDC 1604-B Computer complex at Rome Air Development Center are described in outline. (Author)

8/3. DYNAMIC OCEANOGRAPHY

AD-629 582 See Fld. 8/10

8/4. GEOCHEMISTRY

AD-629 113 See Fld. 8/7

8/5. GEODESY

AD-629 705 Fld. 8/5, 22/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER GEODESY INTELLIGENCE AND MAPPING RESEARCH AND

DEVELOPMENT AGENCY FORT BELVOIR VA

SATELLITE ANGULATERATION.

Research note,
by Armando Mancini. Nov 65, 30p. Rept. no. GIMRADA RN-16,
Proj. DA-4A013001A91D,

Unclassified report

Also includes Supplement to Satellite Angulateration Report.

Descriptors: (*Satellites (Artificial), Position finding), (*Astronomical geodesics, Trigonometry), Range finding, Surveying, Site selection, Data, Optical equipment, Vector analysis, Geodesics, Simulation

A technique of utilizing combined optical and ranging data from satellites is described which leads to the determination of the total station-to-station vector. The application of this technique over the normal space trilateration for certain networks can produce an accuracy improvement of 2 to 1. (Author)

AD-628 885 **See Fld. 20/10**

AD-629 097 **See Fld. 20/10**

AD-629 628 **See Fld. 8/2**

8/6. GEOGRAPHY

AD-629 402 Fld. 8/6, 6/6

MCGILL UNIV MONTREAL (QUEBEC) DEPT OF GEOGRAPHY

SAVANNAS: A REVIEW OF A MAJOR RESEARCH PROBLEM IN TROPICAL GEOGRAPHY. THE INTERIOR OF BRITISH GUIANA AND THE MYTH OF EL DORADO.

Savanna research series, (Technical rept.),
by Theo L. Hills. Dec 65, 29p. Rept. no. SRS-3,TR-3
Contract Nonr-3855 (00) Proj. NR-387-020,

Unclassified report

Availability: Published in Canadian Geographer v9 n4 p216-28 1965/ v2 1961. Copies to DDC users only.

Descriptors: (*Geography, Tropical regions), (*Tropical regions, Geography), (*British Guiana, Natural resources), Plants (Botany), Ecology

AD-629 401 **See Fld. 6/3**

8/7. GEOLOGY AND MINERALOGY

AD-628 908 Fld. 8/7
CFSTI Prices: HC $3.00 MF $0.75

GEOSCIENCE INC CAMBRIDGE MASS

DEEP RESISTIVITY INVESTIGATIONS IN THE CONTINENTAL UNITED STATES.

Final scientific rept.,
by Howard S. Lahman, Arnold Orange, and Keeva Vozoff. Dec 65, 67p. Rept. no. Scientific-8,
Contract AF 19 (628)-2351, Proj. AF-4600 Task 460008,
AFCRL 66-28

Unclassified report

Descriptors: (*Lithosphere, Electrical properties), (*Resistance (Electrical), Lithosphere), (*Rock (Geology), Resistance (Electrical)), Geophysics, Geophysical prospecting, Structural geology

Deep resistivity measurements were carried out to sample deep resistivities of precambian rocks in northern New York, southeastern Massachusetts, southeastern Pennsylvania, west central Virginia, central and western North Carolina, southeastern Missouri, western Oklahoma, central Colorado, southwestern Wyoming, southern Montana, northeastern North Dakota, central Wisconsin, and southeastern Nebraska. In addition, very large scale regional resistivity surveys were conducted in the Pacific Northwest and the extreme southwestern United States. No basement resistivities greater than 100,000 ohm-meters could be definitely established. Basement rocks were found to exhibit wide variations in electrical properties. Faults, fractures, etc. affect the bulk resistivity of the basement to a greater extent than do geologic variations. Since these features are so common, we believe it unlikely that bulk resistivities greater than 100,000 ohm-meters can be found over extensive areas within 10 kilometers of the earth's surface. (Author)

AD-628 913 Fld. 8/7, 3/1

AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

MERRIHUEITE, A NEW ALKALI-FERROMAGNESIAN SILICATE FROM THE MEZO-MADARAS CHONDRITE,

Physical sciences research papers,
by Robert T. Dodd,Jr., W. Randall Van Schmus, and Ursula B. Marvin. 12 Jul 65, 8p. Rept. no. AFCRL-PSRP-167 ,AFCRL-65-849
Proj. AF-8602, Task 860205,

Unclassified report

Prepared in cooperation with Smithsonian Astrophysical Observatory, Cambridge, Mass.

Availability: Published in Science v149 n3687 p972-4 27 Aug 1965. Copies to DDC users only.

Descriptors: (*Meteorites, Minerals), (*Minerals, Meteorites), Potassium compounds, Sodium compounds, Iron compounds, Magnesium compounds, Silicates, Refractive index, Refraction, X-ray diffraction analysis

Merrihueite, a new mineral with the approximate chemical composition (K,Na)2 (Fe,Mg)5Si12O30, occurs with iron -rich olivine, iron-poor pyroxene, and nickel-iron in a few chondrules of the Mezo-Madaras chondrite. The refractive index lies between 1.559 and 1.592; the birefringence for each composition is low to moderate. X-ray powder data for merrhueite are nearly identical to those for osumilite and very similar to those for synthetic K2Mg5Si12O30. Merrihueite is interpreted as an alkali-ferromagnesian silicate mineral of the osumilite type. It is names in honor of the late Craig M. Merrihue, meteoriticist, of the Smithsonian Astrophysical Observatory. (Author)

AD-628 983 Fld. 8/7, 13/2
CFSTI Prices: HC $6.00 MF $1.25

ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS

SELECTED GEOLOGIC LITERATURE LOWER MISSISSIPPI VALLEY DIVISION AREA INDEX AND ANNOTATED BIBLIOGRAPHY.

Technical rept.,
by R. T. Saucier. Jan 66, 131p. Rept. no. TR-3-712,

Unclassified report

Descriptors: (*Geology, Bibliographies), (*Civil engineering, Geology), Maps, Engineering geology, Hydrology

The purpose of this report is to assist the division or district engineers and geologists by evaluating the existing body of geologic literature, by listing and indexing by area the more significant reports, maps, and related material, and by pointing out the primary sources of these data.

AD-629 046 Fld. 8/7, 14/2
CFSTI Prices: HC $1.00 MF $0.50

GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION

INVESTIGATION OF THIN SAMPLES OF MINERAL ROCK UNDER CONDITIONS OF SHEAR DUE TO TORSION AND UNIDIRECTIONAL STRESS.

Research translation,
by M. P. Volarovitch, T. Ya. Gorazdovskii, and E. I. Parkhomendo. Dec 65, 19p. Rept. no. G-T-R-65-9,
Contract AF 19 (628)-5034,
TT 66-60687

Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Geologicheskikh Nauk. Trudy n2 p230-6 1953.

Descriptors: (*Minerals, High-pressure research), (*Rock (Geology), High-pressure research), (*Highpressure research, Geology), Mechanics, Petrology, Hydraulic presses, USSR

AD-629 071 Fld. 8/7
CFSTI Prices: HC $4.00 MF $0.75

ELECTRICAL ENGINEERING RESEARCH LAB UNIV OF TEXAS AUSTIN

AN INVESTIGATION OF THE MAGNETOTELLURIC METHOD FOR DETERMINING SUBSURFACE RESISTIVITIES,

by George H. Hopkins,Jr., and Harold W. Smith.
1 Feb 66, 126p. Rept. no. 140,
Contract Nonr-375 (17), Proj. NR-081-253,

Unclassified report

Descriptors: (*Geophysical prospecting, Telluric currents), (*Telluric currents, Geophysical prospecting), (*Lithosphere, Electrical properties), (*Resistance (Electrical), Lithosphere), Texas, Geology, Earth models, Data processing systems

A series of micropulsation recordings was made at two locations in the Delaware Basin of West Texas. Magnetotelluric resistivity soundings have been computed from this data in the range of 0.0003 to 10.0 cps. Considerable attention is devoted to the computation techniques involved, which include power spectrum analysis, digital prewhitening and alias filtering, and decimation. Horizontally stratified earth models are derived from the data with the aid of a computer program which calculates and plots apparent resistivity and phase curves, including source dimension effect, for up to a 40 layer model, allowing 12 parameter permutations. The models, which represent penetration depths from about 400 m to over 100 km, are compared with available geologic information. Source dimension effects are shown to be negligible for spatial wavelengths exceeding 600 km. An anisotropy in the data is investigated with the aid of a computer program which performs a virtual rotation of the measurement axes and determines the variation with frequency of the azimuth of apparent resistivity extremes. The source of the anisotropy seems to be in the basement rocks more than 6.4 km deep. (Author)

AD-629 074 Fld. 8/7

POMONA COLL CLAREMONT CALIF DEPT OF PHYSICS

OXYGEN DETERMINATIONS IN SILICATES AND TOTAL MAJOR ELEMENTAL ANALYSIS OF ROCKS BY SOFT X-RAY SPECTROMETRY,

by A. K. Baird, and B. L. Henke. 3 Dec 64, 6p.
Contract AF-AFOSR-689-64,NSF-GP-1336
Proj. AF-9767, Task 976701,
AFOSR 65-2150

Unclassified report

Availability: Published in Analytical Chemistry v37 n6 p727-9 May 1965. Copies to DDC users only.

Descriptors: (*Silicates, X ray spectroscopy), (*Igneous rock, X ray spectroscopy), (*X ray spectroscopy, Igneous rock), (*Petrology, X ray spectroscopy), Oxygen, Geochemistry, Rock (Geology), Chemical analysis

New developments in forming thinfilm x-ray tube and detector windows and building large d-spacing analyzing crystals have resulted in 30- to 50-fold increases in the counting rates for oxygen K alpha in silicates using a vacuum-path x-ray spectromet-

er. A test of the precision of oxygen determinations over the range 44 to 54% shows that it is now possible to achieve better than 1% relative standard deviation in routine rock analyses. This improved precision allows the detection of significant biases in calibration which seem to be caused by an inadequate knowledge of the concentrations of the other elements present and by the lack of adequate standards. (Author)

AD-629 113 Fld. 8/7, 8/4
CALIFORNIA UNIV LOS ANGELES INST OF GEOPHYSICS AND PLANETARY PHYSICS
THE GEOCHRONOLOGY OF THE BLIND RIVER-BRUCE MINES AREA ONTARIO, CANADA.
Environmental research papers,
by Randall Van Schmus. 28 Dec 64, 32p. Proj. AF-8602, Task 860205,
AFCRL ERP-157 ,AFCRL 65-851
Unclassified report

Availability: Published in Journal of Geology v73 n5 p755-82 Sep 1965. Copies to DDC users only.

Descriptors: (*Geologic age determination, Ontario), (*Ontario, Geology), (*Petrology, Ontario), Geochemistry, Stratigraphy

The purpose of this paper is to present rubidium-strontium age determinations from Precambrian rocks exposed in the area along the north shore of Lake Huron in Ontario, Canada, and by mea.is of them to develop the Precambrian chronology and correlations of this area.

AD-629 438 Fld. 8/7, 20/2, 7/2
CFSTI Prices: HC $1.60 MF $0.50
MICHIGAN UNIV ANN ARBOR DEPT OF GEOLOGY AND MINERALOGY
STUDY OF POLYTYPIC PHASE RELATIONS AMONG COMPLEX INORGANIC STRUCTURES.
Semi-Annual rept. no. 1, 1 May-31 Oct 65,
by Donald R. Peacor. Nov 65, 11p. Rept. no. 07325-1-T,
Contract DA-28-043-AMC-01338 (E), Proj. DA-1P0-14501-B11A-00,
ECOM 01338 (E)-1
Unclassified report

Descriptors: (*Minerals, Crystal structure), (*Crystal structure, Minerals), Crystal lattices, Crystal substructure, Phase studies, Spinels, Twinning (Crystallography), X-ray diffraction analysis, Oxides, Ferrites

Some polytypic relations between the naturally occurring phases hogbomite, nigerite, taaffeite and senaite are reviewed. In addition, nigerite is shown to have a unit cell with a and c equal, respectively, to 5.79 and 56.20 A. It has a substructure with the lattice type and approximate dimensions of the gahnite spinel structure on which nigerite occurs in oriented overgrowths. Twinning on pseudocubic symmetry elements further confirms the close relation between nigerite and gahnite. The polytypic relations among these several oxides are shown to be quite complex and to vary as a function of several compositional and/or structural variables. (Author)

AD-628 966 See Fld. 8/10

AD-629 073 See Fld. 8/11

AD-629 136 See Fld. 8/10

AD-629 142 See Fld. 8/10

AD-629 582 See Fld. 8/10

AD-629 702 See Fld. 20/12

8/8. HYDROLOGY AND LIMNOLOGY

AD-629 407 See Fld. 18/3

8/10. PHYSICAL OCEANOGRAPHY

AD-628 916 Fld. 8/10, 4/2
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
STATISTICAL EVALUATION OF GAS CHROMATOGRAPHY FOR THE DETERMINATION OF DISSOLVED GASES IN SEA WATER.
Interim rept.,
by V. J. Linnenbom, J. W. Swinnerton, and C. H. Cheek. 2 Feb 66, 20p. Rept. no. NRL-6344, Proj. RR-002-10-45-5052,
Unclassified report

Descriptors: (*Sea water, Gases), (*Gas chromatography, Sea water), Oceanography, Chemical analysis, Statistical analysis

A gas chromatographic method developed by the authors for the determination of dissolved gases in sea water has been evaluated with respect to precision and accuracy by comparison with other methods. Both laboratory and shipboard measurements were employed in the evaluation. Dissolved oxygen analyses made at sea under routine conditions of operation over a period of two weeks indicate statistically significant differences in precision for the three methods tested: gas chromatography (plus or minus 1.8%), standard Winkler method (plus or minus 1.0%), and a modification of the Winkler method (plus or minus 0.51%). No significant bias was found between gas chromatography and the improved Winkler method; a small but statistically significant bias (-1%) was found for the standard Winkler method relative to the other two. From a practical point of view, these differences are not considered important for routine survey operations. The dissolved N2 data obtained by gas chromatography are grouped about a mean value of 100% saturation, with approximately 95% of the values falling within (100 plus or minus 5)% saturation. The advantages of gas chromatography (routine analyses by relatively nonskilled personnel to obtain simultaneous measurements of more than one gas on a small volume of liquid) are felt to be sufficient to warrant its further use in oceanography. (Author)

AD-628 966 Fld. 8/10, 8/7
SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIV OF CALIFORNIA LA JOLLA
SUBBOTTOM PROFILE OF ABYSSAL SEDIMENTS IN THE CENTRAL EQUATORIAL PACIFIC,
by G. Ross Heath, and Theodore C. Moore,Jr.,
10 May 65, 5p. Contract Nonr-2216 (23), Proj. NR-083-005,
Unclassified report

Availability: Published in Science v149 n3685 p744-46 Aug 13, 1965. Copies to DDC users only.

Descriptors: (*Marine geology, Pacific Ocean), (*Pacific Ocean, Marine geology), (*Hydrographic surveying, Pacific Ocean), Ocean bottom topography, Hydrographic sonar

A north-south subbottom acoustic profile made in the central Pacific Ocean shows that the first layer (unconsolidated and semiconsolidated sediments) increases in thickness from less than 200 meters at about 14N to more than 600 meters near the equator. Two major faults, one of which lies on the extension of the Clipperton fracture zone, have produced vertical separations of about 400 meters in the base of the first layer. (Author)

AD-629 136 Fld. 8/10, 8/7
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF MARINE PHYSICAL LAB
REFLECTION PROFILES ACROSS THE MIDDLE AMERICA TRENCH,
Revised ed.,
by David A. Ross, and George G. Shor,Jr.. 6 Aug 65, 23p. Contract Nonr-2216 (05) ,NSF-GP-910
Unclassified report

Revision of manuscript submitted 25 Mar 65.

Availability: Published in Journal of Geophysical Research v70 p5551-72 1965. Copies to DDC users only.

Descriptors: (*Marine geology, Central America), (*Hydrographic surveying, Pacific Ocean), Marine geophysics, Ocean bottom topography, Hydrographic sonar, Structural geology

In the summer of 1963 reflection profiles were made across the Middle America trench between Tres Marias Islands and the coast of Panama using an electric sound source (the 'Arcer'). A syncline underlies the continental shelf in the Gulf of Tehuantepec and the Gulf of Panama. A topographic bench frequently found part way down the landward flank of the trench may be continuous for most of the length of the trench. Underlying the bench is a basin partially or completely filled with sediment held by a linear ridge on the seaward side. The sediments in this basin, 400 meters or more thick, show evidence of folding, faulting, and slumping. Little evidence of sediment, other than occasional slumped blocks, was observed on the slope between the perched basin and the trench bottom, although cores in the northern part of the trench indicate at least a thin veneer of sediment on the slope. The trench bottom shows varying amounts of sediment (100 to more than 700 m); reflections from the base of the sediment were not always observed. Sediments in the trench bottom are folded and in many places dip down toward the landward side. At one location a partially buried hill or ridge has ponded the sediments in the trench bottom. (Author)

AD-629 142 Fld. 8/10, 8/7
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF MARINE PHYSICAL LAB
TRANSCURRENT FAULTING IN THE OCEAN FLOOR,
by V. Vacquier. 1965, 6p. Rept. no. MPL-U-16/64,
Contract Nonr-2216 (01) ,Nonr-2216 (05)
Unclassified report

Presented at Symposium on Continental Drift. Section B. Horizontal Displacements in the Earth's Crust.

Availability: Published in Philosophical Transactions of the Royal Society, v258 p77-81 1965. Copies to DDC users only.

Descriptors: (*Faults (Geology), Ocean bottom topography), (*Marine geology, Faults (Geology)), (*Pacific Ocean, Ocean bottom topography), Marine geophysics, Structural geology

Displacements along strike slip faults in the ocean floor are measured by fitting magnetic anomaly patterns. In the northeastern Pacific Ocean the combined left lateral displacement of 1400 km across the Mendocino and the Pioneer faults can now be followed with a few interruptions from 140 to 165 degrees W, or a distance of 2200 km. The western end of the correlatable pattern has not yet been reached. In latitude the pattern stretches between 28 and 41 degrees N, or a distance of 1450 km. Right lateral displacements of 150 and 680 km separated by a disturbed zone have been measured on the Murray fault between 125 and 152 degrees W. The disturbed zone occurs on the south side of the Murray fault. It is characterized by more rugged topography and is bordered by groups of volcanoes at its eastern and western boundaries. Across the faults the bathymetric con-

tours are displaced in the same direction and roughly by the same amount as the magnetic intensity pattern. Fourteen magnetic profiles across the Mid-Atlantic Ridge between 30 and 6 degrees S show a persistent magnetic anomaly on the crest of the ridge which can be followed from one profile to the next, whereas topographic features lack this continuity. Mapping the position of the crest anomaly suggests that if the ridge was originally continuous, it has now been cut into sections by strike slip faults. (Author)

AD-629 156 Fld. 8/10
CFSTI Prices: HC $4.00 MF $0.75
NEW YORK UNIV N Y GEOPHYSICAL SCIENCES LAB
AN INVESTIGATION OF THE INTERMEDIATE SALINITY MAXIMUM IN THE EQUATORIAL ATLANTIC DURING EQUALANT I.
Technical rept.,
by Robert Glenn Williams. Feb 66, 103p. Rept. no. tr-66-4,
Contract Nonr-285 (57),
Unclassified report

Descriptors: (*Atlantic Ocean, Salinity), (*Salinity, Atlantic Ocean), Tropical regions, Oceanographic data

The distribution of salinity, mass, and the circulation in the upper 500 meters of the Atlantic between 10 degrees N and 10 degrees S is investigated by analysis of Equalant 1 data. Particular attention is given to locating the sources of high salinity feeding the Equatorial Undercurrent, and to determining the nature and extent of the intermediate salinity maximum layer. This layer is shown to exist everywhere, except in the Gulf of Guina south of 7 degrees 30 min S, and in a very small patch off Cape Orange, centered at 9 degrees N, 38 degrees W. There is a discrepancy between this result and Defant's vertical circulation model in the western South Atlantic. The sources of high salinity core of the Equatorial Undercurrent are the highly saline water masses lying close to the South American continent, both north and south of the equator. There are no significant intrusions of high salinity into the Equatorial Undercurrent east of 37 degrees W, although the high salinity core of the Undercurrent is identified as far east as 3 degrees E. (Author)

AD-629 582 Fld. 8/10, 8/3, 8/7
CFSTI Prices: HC $3.00 MF $0.50
LOUISIANA STATE UNIV BATON ROUGE COASTAL STUDIES INST
AUSTRALIAN TIDAL FLATS.
Technical rept.,
by Richard J. Russell, and William G. McIntire.
15 Nov 65, 56p. Rept. no. TR-26-pt-B,Contrib-65-6
Contract Nonr-1576 (00),Nonr-1575 (03) Proj. NR-388-002,
Unclassified report

Descriptors: (*Australia, Beaches), (*Beaches, Australia), (*Tides, Australia), Marine geology, Seacoast, Sand, Sedimentation, Tidewater

Investigations along the eastern and western coasts of Australia in the winter of 1961 preceded more intensified observation during the summer (February-April) of 1963. A number of beaches in Queensland and Western Australia are described briefly in journal style. Five sections were surveyed during the second period of field work; two near Darwin, N. T., and three near Port Hedland, W. A. Flats exposed during low spring tide in territory where the maximum tidal range amounts to 30 or 40 feet differ conspicuously on the basis of whether coastal sand supply is excessive or deficient. In the former case, sand is being lost rapidly to water beyond dropoffs, from whence it will not be returned to beach-dune systems. Flats on a coast deficient in sand are less interesting from this standpoint of beach processes but are exciting biologically. The surveyed sections and 45 illustrations are included. (Author)

AD-629 672 Fld. 8/10, 18/8, 14/2
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
THE USE OF A DEEP-WATER GAMMA RADIOMETER FOR THE MEASUREMENT OF RADIOACTIVITY IN THE OCEAN,
by L. M. Khitrov, and K. A. Kotlyarov. 1966, 20p. Rept. no. Translation-2120,
TT 66-60744
Unclassified report

Trans. of mono. Primenenie Glubokovodnogo Gamma-Radiometra dlya Izmereniya Radioaktivnosti v Okeane, Moscow, 1964 p170-82.

Descriptors: (*Radioactivity, Measurement), (*Radiometers, Underwater), (*Indian Ocean, Radiation effects), Oceans, USSR, Gamma rays, Seas, Contamination

Conclusion: There was created an original automatic deep-water gamma-radiometer with a sensitivity threshold of 2 x 10 to the -10th power curie, intended for the measurement of total natural radioactivity (r/a) at the maximum depths of the oceans of the world. During measurements of the gamma-background of the depths of the central and northern parts of the Indian Ocean in 1960, there was not found any increase in the r/a level exceeding the natural level by more than 2-3 times. (Author)

AD-629 138 **See Fld. 7/4**

8/11. SEISMOLOGY

AD-628 901 Fld. 8/11, 17/10
CFSTI Prices: HC $6.00 MF $1.50
ADVANCED RESEARCH PROJECTS AGENCY WASHINGTON D C
LARGE APERTURE SEISMIC ARRAY. LASA SYSTEMS EVALUATION CONFERENCE (1ST) SEPTEMBER 11-13, 1965.
Feb 66, 300p.
Unclassified report

Descriptors: (*Seismology, Instrumentation), (*Seismological stations, Montana), (*Seismometers, Underground structures), Seismographs, Configuration, Installation, Data transmission systems, Data processing systems, Seismic waves, Nuclear explosions, Detection, Symposia

This conference report consists of a compilation of papers describing the LASA installation in Montana. This includes the ground installation, data transmission and data acquisition systems. In addition, the proposed long-period seismometer installation is discussed, as well as potential on-line and off-line processing systems for the Billings Data Center. Preliminary results from the installation are reported along with results from Tonto Forest Seismological Observatory with instruments spaced over similar distances. An extensive series of papers describe the beam pattern analyses for the LASA installation and present theoretical data which will bear on the array geometry if additional arrays are to be constructed. Finally, prototype station requirements are developed, reflecting the current assessment of the desirable station configuration. (Author)

AD-628 933 Fld. 8/11, 17/10
CFSTI Prices: HC $4.00 MF $0.75
DAVID SARNOFF RESEARCH CENTER PRINCETON N J
AN ANALYSIS OF FACTORS LIMITING SEISMIC DETECTOR SENSITIVITY.
Final rept., 16 Oct 64-15 Jan 66,
by Donald S. McCoy. 28 Feb 66, 122p. Contract AF 49 (638)-1456,ARPA Order-292 Proj. AF-8100 ,AF-3810
AFOSR 66-0494
Unclassified report

Descriptors: (*Seismometers, Signal-to-noise ratio), Galvanometers, Amplifiers, Feedback Noise (Radio), Sensitivity, Seismology

A detailed analysis is presented to show the effect of certain design parameters on the signal-to-noise ratios of systems in which seismometers are coupled to galvanometer amplifiers. General guidelines are presented for optimizing the signal-to-noise ratio of such systems. The effect of feedback on the signalto-noise ratio of seismic detector systems is analyzed. It is shown that if the amplifier input resistance is much higher than the required external damping resistance for a given seismometer transducer, the use of feedback to reduce the amplifier input resistance provides better signal-to-noise ratio than the use of a shunt resistance at the amplifier input terminals. It is also shown that feedback should not be used to increase the amplifier input resistance in order to provide proper damping. The potential advantage of displacement transducers over velocity transducers at lower frequencies is discussed. It is contended that the displacement transducer can have no advantage at frequency for which the sensitivity of the velocity transducer system is limited by the thermal noise of the amplifier input resistance. The lowest useful frequency for the velocity transducer system is determined in practice by the 1/f noise of the amplifier. The sensitivity of clusters of seismometers connected to a single amplifier is summarized briefly and noise measurements on the Texas Instruments RA-3 Parametric Amplifier are presented. (Author)

AD-629 073 Fld. 8/11, 8/7
XAVIER UNIV CINCINNATI OHIO SEISMOLOGICAL OBSERVATORY
EARTHQUAKE HISTORY OF OHIO,
by Edward A. Bradley, and Theron J. Bennett.
30 Mar 65, 9p. Contract AF-AFOSR-677-64, Proj. AF-8652,
AFOSR 65-2905
Unclassified report

Availability: Published in Bulletin of the Seismological Society of America v55 p745-52 Aug 1965. Copies to DDC users only.

Descriptors: (*Earthquakes, Ohio), (*Seismology, Ohio), History, Geology

Some 78 earthquakes occurring in Ohio in the years 1776 through 1964 have been tabulated. A literature search of newspapers and scientific journals was undertaken and a reasonably complete history from 1900 to the present may be assumed. The most prominent feature of the catalogue is the high concentration of shocks in the Anna region. Certain geological trends are indicated, but evidence is inadequate to establish a definite correlation. (Author)

AD-629 088 Fld. 8/11
CFSTI Prices: HC $4.00 MF $1.00
WESTON GEOPHYSICAL RESEARCH INC MASS
CHARACTERISTICS AND PROPERTIES OF EXTREME SEISMIC EVENTS.
Final rept., 1 Mar 63-30 Nov 65,
by Richard J. Holt. 31 Jan 66, 142p. Contract AF 19 (628)-2776, Proj. AF-7639, Task 763902, AFCRL 66-23
Unclassified report

Descriptors: (*Seismological stations, New Hampshire), (*Seismometers, Site selection), (*Seismology, Instrumentation), Seismic waves, Extremely low frequency, Recording systems

An equilateral triangular array of three vertical Hall-Sears (HS-10-2) two cycle seismometers approximately one mile apart was installed in New Boston, New Hampshire, to study the statistical properties of large amplitude seismic events in the frequency bands between one and one hundred cycles per second. The time before and after the

maximum of 'P' waves was studied to determine the properties of such things as: 1. estimation of the largest event expected, based upon parameters of the measured events; 2. azimuths from the array to the events computed at different amplitude levels primarily to determine the reliability of computed azimuth at different system gains; 3. the return periods of events measured to estimate the expected time between events; 4. the decay of the envelope of the 'P' phase of large events. Two parameters were determined for each event; the average amplitude level in a one second time interval and the number of peaks in that same time interval. The behavior of these parameters and the resulting statistical characteristics of the events are given. (Author)

AD-629 263 Fld. 8/11
CFSTI Prices: HC $1.10 MF $0.50
VELA SEISMIC INFORMATION ANALYSIS CENTER UNIV OF MICHIGAN ANN ARBOR
VESIAC SEMIANNUAL INDEX OF BULLETIN CONTENTS.
15 Jan 66, 8p. Rept. no. VESIAC semiannual index-6,
Unclassified report

Descriptors: (*Seismology, Indexes), Periodicals

AD-629 264 Fld. 8/11
CFSTI Prices: HC $1.60 MF $0.50
VELA SEISMIC INFORMATION ANALYSIS CENTER UNIV OF MICHIGAN ANN ARBOR
VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
15 Jan 66, 13p. Rept. no. VESIAC bulletin-36,
Unclassified report

Descriptors: (*Seismology, Bibliographies), Periodicals, Scientific research

AD-629 431 Fld. 8/11, 17/10
CFSTI Prices: HC $3.60 MF $0.50
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
LONG RANGE SEISMIC MEASUREMENTS. CUP.
Scientific rept.,
by Don M. Clark. 11 Feb 66, 31p. Rept. no. Seismic Data Lab-136,
Contract AF 33 (657)-12447,ARPA Order-624
Proj. VELA T/2037,
Unclassified report

Descriptors: (*Seismology, Nuclear explosions), (*Nuclear explosions, Seismology), Nevada, Underground explosions, Earthquakes, Seismic waves, Identification systems, Seismological stations, Instrumentation

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-629 466 Fld. 8/11
INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS UNIV OF CALIFORNIA SAN DIEGO
COHERENCE MEASUREMENTS WITH TIME SAMPLING OCEAN-BOTTOM SEISMOMETERS,
by H. Bradner, J. Dodds, and R. Foulks. 14 Sep 65, 4p. Contract AF 49 (638)-1388,
Unclassified report

Availability: Published in IEEE Proceedings v53 n12 p1906-8 1965. Copies to DDC users only.

Descriptors: (*Seismometers, Ocean bottom), (*Marine geophysics, Seismology), Underwater equipment, Transducers

Instruments for obtaining simultaneous records of ocean-bottom seismic motion are described. Preliminary ocean-bottom seismic data with two simultaneous three-component instruments indicates that instrument noise and water currents may cause small differences in the detailed spectra. The general features of the spectra, however, appear to be the same from proximate instruments. (Author)

AD-629 532 Fld. 8/11
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
PARTIAL DERIVATIVES OF SURFACE WAVE PHASE VELOCITY WITH RESPECT TO PHYSICAL PARAMETER CHANGES WITHIN THE EARTH.
Revised ed.,
by H. Takeuchi, J. Dorman, and M. Saito. 10 Apr 64, 13p. Contract AF-AFOSR-62-303, AFOSR 65-2891
Unclassified report

Revision of manuscript submitted 20 Dec 63.

Availability: Published in Journal of Geophysical Research v69 n16 p3429-41 15 Aug 64. Copies to DDC users only.

Descriptors: (*Seismic waves, Propagation), Seismology, Mathematical models, Earth models, Geophysics

By using energy equations, which are equivalent to fundamental equations and boundary conditions in surface wave problems, analytical expressions for partial derivatives of phase velocity can be derived with respect to changes of physical parameters within the earth. These derivatives can be calculated by knowing only the eigenfunction corresponding to the phase velocity. Numerical examples are worked out for CANSD (a model proposed by Brune and Dorman for the Canadian shield), the Jeffreys model, and the Gutenberg model for crustmantle structure. An application of the present result to numerical inversion of surface wave data is demonstrated by an example. (Author)

AD-629 739 Fld. 8/11, 17/10, 9/2
CFSTI Prices: HC $3.60 MF $0.50
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
AN EXAMPLE OF MAXIMUM-LIKELIHOOD FILTERING OF LASA SEISMOGRAMS.
Scientific rept.,
by E. A. Flinn, R. A. Hartenberger, and D. W. McCowan. 14 Mar 66, 38p. Rept. no. Seismic Data Lab-139,
Contract AF 33 (657)-15919,ARPA Order-624
Proj. VELA-T/6702,
Unclassified report

Descriptors: (*Seismology, Data processing systems), (*Data processing systems, Seismology), Seismometers, Earthquakes, Microseisms, Seismic waves, Magnetic tapes, Data storage systems, Filters (Electromagnetic waves), Signal-to-noise-ratio, Wave analyzers

Realizable maximum-likelihood filtering was compared to time-shift-and-summation (phased summation) as an array processing procedure, using records from a single earthquake made by 398 seismometers at the Montana Large Aperture Seismic Array (LASA). The records were prefiltered to eliminate long-period microseismic noise. Within a single subarray (seven kilometers diameter), the maximum-likelihood filter improved signal-to-noise ratio approximately 5 db more than the phased sum. As a method for combining subarray outputs there was no significant difference between the maximumlikelihood filter and phased summation. Approximately two hours of CDC 1604-B machine time were required to calculate the maximum-likelihood filter for each 19-channel subarray. (Author)

8/12. SNOW, ICE, AND PERMAFROST

AD-629 675 Fld. 8/12, 13/2, 1/5
CFSTI Prices: HC $4.60 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
COMPACTED-SNOW RUNWAYS IN ANTARCTICA, DEEP FREEZE 61-64 TRIALS.
Technical rept., 1961-1964,
by R. C. Coffin,Jr.. Feb 66, 49p. Rept. no. TR-R-399,
Proj. Y-F015-11-01-054,
Unclassified report

Descriptors: (*Snow, Runways), (*Runways, Snow), (*Antarctic regions, Landing fields), Civil engineering, Compacting, Roads, Trafficability, Snow vehicles

In Deep Freeze 61, NCEL provided technical guidance to a Navy snow-compaction team investigating the practicability of building roads on snow-covered sea ice over McMurdo Sound and runways on the deep snow cover of the Ross Ice Shelf adjacent to McMurdo Station. These investigations and trials continued through Deep Freeze 64. This work was directed toward the development of a layered, compacted-snow runway on deep snow which would support aircraft weighing up to 155,000 pounds with tires on the main wheels inflated to 135 psi; it was only partially successful. During the trials, there were intermittent areas of compacted snow capable of supporting aircraft weighing up to 100,000 pounds with main tires inflated to 90 psi, but low-strength areas prevented takeoffs and landings with aircraft weighing over 25,000 pounds with main tires inflated to 60 psi. New processing and elevating equipment introduced in the Deep Freeze 64 trials showed considerable promise of producing dense, uniform, high -strength, elevated areas of compacted snow. It was concluded that the trials should continue in Deep Freeze 65 to explore the capabilities of this equipment. (Author)

8/13. SOIL MECHANICS

AD-629 522 See Fld. 13/6

8/14. TERRESTRIAL MAGNETISM

AD-629 087 Fld. 8/14, 4/1, 3/2
CFSTI Prices: HC $1.60 MF $1.00
CALIFORNIA UNIV BERKELEY SPACE SCIENCES LAB
SOME SPECTRAL CHARACTERISTICS OF GEOMAGNETIC VIBRATIONS.
Technical rept.,
by Ruben Zelwer. 31 Jan 66, 148p. Rept. no. Series-7-Issue-5,
Contract Nonr-222 (89), Proj. NR-371-350,
Unclassified report

Descriptors: (*Terrestrial magnetism, Oscillation), Solar disturbances, Ionospheric disturbances, Magnetic storms, Magnetohydrodynamics, Geophysics

Standard Magnetograms of 14 stations distributed around the world were analyzed by means of a running power spectrum technique in an attempt to detect what may be interpreted as changes in the state of the magnetosphere from the shift of the frequency peaks of the power spectrum analyses. The event chosen was the magnetic storm of October 7, 1962, at which time the Mariner II spacecraft was on its way to Venus. The results show that the technique used is not very appropriate for the objective, for the presence of an important event of large amplitude on the data, even if it is of a very short duration, will greatly determine the character of the power spectrum. It is shown that

the phenomenon is of world wide nature as detected from the technique used, but no conclusions can be drawn from the geographic distribution of occurrence of the spectral peaks. The work also includes a survey of the power spectrum analysis techniques as well as the results of some spectral computation experiments. (Author)

AD-628 893 See Fld. 4/1

AD-629 319 See Fld. 20/14

Field 9-ELECTRONICS AND ELECTRICAL ENGINEERING

9/1. COMPONENTS

AD-628 907 Fld. 9/1, 9/3
CFSTI Prices: HC $1.60 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
THERMAL CRACKING OF WAVEGUIDE WINDOWS.
Technical note,
by C. E. Muehe. 9 Feb 66, 12p. Rept. no. TN-1966-19,
Contract AF 19 (628)-5167,
ESD TDR-66-34

Unclassified report

Descriptors: (*Waveguide windows, Thermal stresses), (*Fracture (Mechanics), Waveguide windows), Theory, Radiofrequency, Electromagnetic fields, X band, Mathematical analysis

A theory is derived to explain the cracking of waveguide windows due to stresses generated by heat dissipated in the window when subject to the RF fields in a waveguide. Calculations of the temperature rise and power-handling ability of half-wavelength block windows at X-band are presented. (Author)

AD-628 990 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
PRODUCTION ENGINEERING MEASURE FOR SILICON LINEAR INTEGRATED CIRCUITS.
Quarterly progress rept. no. 2, 20 Jul-20 Oct 65,
by Robert McGinnis, Thomas Quaid, and Thomas Monaghan. Jan 66, 22p. Contract DA-36-039-AMC-06158 (E) Proj. DA-25001,

Unclassified report

Descriptors: (*Integrated circuits, Silicon), Manufacturing methods, Linear systems, Radio receivers, Frequency modulation, Portable, Modules (Electronic), Radiofrequency amplifiers, Mixers (Electronic), Radiofrequency oscillators

This report describes the work accomplished during the second quarterly period in the effort to produce silicon linear integrated circuits of the type used in FM receivers. During this interval, the effort was devoted to developing the receiver front-end circuits; i.e., the circuits which preceded the i-f filter. These include the r-f amplifier, the first and second mixers, and the first and second local oscillators. The five integrated circuits which performed these functions in the demonstration radio, Contract DA-28-043-AMC-00150 (E), are replaced by three monolithic IC's of the following description: (1) RF Amplifier: Electrically identical to the IC 732 except for IC layout and pin arrangement. (2) First Mixer-Oscillator: Monolithic IC containing both mixer and oscillator circuitry. (3) Second MixerOscillator: Identically the same chip as used in the first mixer-oscillator; modified only by external connections. The evaluation of the i-f amplifier (IC 977) and the integrated circuit processing of the audio and limitersquelch IC's was continued during this reporting period. (Author)

AD-629 005 Fld. 9/1
CFSTI Prices: HC $5.60 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
LOW FREQUENCY SHIELDING OF A CIRCULAR LOOP ELECTROMAGNETIC FIELD SOURCE.
Research rept.,
by J. Ronald Moser. 26 Jan 66, 54p. Rept. no. USL-716,

Unclassified report

Thesis.

Descriptors: (*Electromagnetic shielding, Low frequency), Electromagnetic fields, Metal plates, Aluminum, Copper, Steel, Thickness, Effectiveness, Radio interference, Extremely low frequency, Very low frequency, Experimental data, Theory

The problem of low frequency shielding of a loop axially perpendicular to a plane shield of infinite extent is analyzed by (1) the thin shield work of Samuel Levy, (2) solution of the vector wave equation, and (3) application of the transmission theory of shielding of S. A. Schelkunoff. Experimental data are obtained and compared with results of techniques (1) and (3) in the frequency range 100 cps to 50 kc. The first analytical technique is not general, and the limits of applicability of the results are discussed. In the second solution, which is general, expressions are derived for the total electric and magnetic fields on both sides of and within the shield. The resulting expression for shielding effectiveness is not solved because of its complexity. The results of the third theory are adapted to the problem. The shielding effectiveness expression $S = R + A + B$ is computer evaluated for the six shields considered (1/16-inch and 1/8-inch thick aluminum, copper, and steel). Although some approximations are made, this analytical method is the most useful in predicting the insertion loss of the shield, since the theory includes those parameters neglected in the first analytical technique. (Author)

AD-629 126 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
TECHNOLOGY FOR PNP INTEGRATED CIRCUITS.
Technical rept.,
by Armand P. LaRocque, Nicholas O. Korolkoff, Alex Rogel, Gordon McNeil, and Vincent E. Rible. Jan 66, 32p. Proj. DA-1P6-22001-A-056,

ECOM 2665

Unclassified report

Descriptors: (*Integrated circuits, Silicon), Manufacturing methods, Semiconductor devices, Diffusion, Processing, Substrates, Computer logic

The report describes the materials used and the facilities, techniques, and processes which were developed in an effort to fabricate experimental monolithic silicon PNP integrated circuits. The following processes are described: thermal polish, N-type phosphorous isolation diffusion, N-type antimony base and resistor diffusion, N (+) phosphorous contact diffusion, P-type boron emitter, guard ring and collector contact diffusion, photolithography, microphotography, aluminum metallizing, chip mounting, and nail-head thermocompression bonding. The facilities are described, the experimental circuits are shown schematically, and the procedures used in fabricating a circuit are also given. (Author)

AD-629 128 Fld. 9/1
CFSTI Prices: HC $3.00 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
FABRICATION AND EVALUATION OF VACUUM DEPOSITED CERMET (CR-SIO) RESISTORS.
Technical rept., 1 Jan 63-31 Aug 65,
by Clifford M. Ault. 31 Jan 66, 51p. Rept. no. nafi-TR-688,

Unclassified report

Descriptors: (*Resistors, Cermets), (*Cermets, Resistors), Chromium, Silicon compounds, Monoxides, Vacuum apparatus, Vapor plating, Films, Resistance (Electrical), Manufacturing methods, Performance (Engineering)

The report discusses details of materials, process and evaluation employed in determining the characteristics and capabilities of chromium-silicon monoxide cermet resistors prepared by In-Line vacuum deposition. (Author)

AD-629 172 Fld. 9/1
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
ANALYSIS AND SYNTHESIS OF NON-UNIFORM TRANSMISSION LINES INCORPORATING LOSS,
by H. A. Stadmore. 1965, 13p. Contract AF 49 (638)-1373 ,AF-AFOSR-62-280
AFOSR 65-2336

Unclassified report

Availability: Published in IEEE International Convention Record, pt7 p7-17 1965. Copies to DDC users only.

Descriptors: (*Transmission lines, Synthesis), (*Approximation (Mathematics), Transmission lines), Electrical impedance

A method of analysis and synthesis of a lossy, passive, reciprocal non-uniform transmission line is presented. Solutions to the assumed Telegrapher's equations are cast in terms of a Volterra integral equation to make use of the inherent convergence properties when iterative methods are applied. Utilizing complex normalization it is possible to formulate a scattering matrix referenced to arbitrary generator and load impedances. The first order approximation to the input scattering coefficient, is derived and specialized to the case of parallel loss. A synthesis procedure for this is outlined. Higher order approximations to the coefficient in the general loss case are indicated for the analysis problem. (Author)

AD-629 178 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
LEWIS (E B) CO INC EAST HARTFORD CONN
PRODUCTION ENGINEERING MEASURE CRYSTAL UNIT CR- (XM-46A)/U.
Quarterly rept. no. 10, 1 May-1 Aug 65,
by Robert P. McComb. 1 Aug 65, 26p. Contract DA-36-039-sc-86737,

Unclassified report

See also AD-625 202.

Descriptors: (*Crystal filters, Manufacturing methods), Very high frequency, Resistance (Electrical), Performance (Engineering), Quartz, Wiring diagrams

The problems of fabrication of units at 70 MHZ is discussed. The methods of making preproduction tests at 30 and 45 MHZ is shown. (Author)

AD-629 189 Fld. 9/1, 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
FLUX CREEP AS A DOMINANT SOURCE OF DEGRADATION IN SUPERCONDUCTING SOLENOIDS,
by Y. Iwasa, and D. Bruce Montgomery. 9 Sep 65, 5p. Contract AF 49 (638)-1468,
AFOSR 66-0224

Unclassified report

Availability: Published in Applied Physics Letters v7 n9 p231-3 Nov 1 1965. Copies to DDC users only.

Descriptors: (*Superconductors, Solenoids), (*Solenoids, Superconductors), Electric currents, Magnetic fields, Heating, Degradation

The Letter reports experimental evidence that the mechanism of unstable flux creep arising from thermal instabilities is responsible for the current degradation commonly observed in superconducting solenoids. Transient flux creep was induced in a sample by means of suitable magnetic field pulses. With the sample carrying a transport current, the resistivity arising during flux creep produced transient joule heating, and when the current was large enough, the heating was sufficient to exceed the local critical temperature, thereby resulting in a quench.

AD-629 199 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
CORNELL-DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO NORWOOD MASS
PRODUCTION ENGINEERING MEASURE FOR CAPACITORS, FEED-THROUGH, SOLID ELECTROLYTE TANTALUM PELLET.
Quarterly rept. no. 7, 1 Oct-31 Dec 65,
by W. G. Bailey. 31 Dec 65, 21p. Contract DA-36-039-AMC-03630 (E)
Unclassified report

See also AD-624 513.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Electrolytes, Solids, Tests, Specifications

Qualification testing of preproduction samples was continued into this quarter. Group II Tests (shock, vibration, salt spray, temperature and immersion) were completed and there were no failures. Group V Test (Life) completed 2017 hours. There was only one unit that failed the life test (a short at 1373 hours) under normal operating conditions of 35 VDC, 85C. This is exclusive of the failures lost due to oven overheating. (Author)

AD-629 246 Fld. 9/1, 17/2.1
CFSTI Prices: HC $4.00 MF $0.75
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES
DEVELOPMENT OF A 50-WATT, 80-MC LINEAR AMPLIFIER TRANSISTOR.
Final technical rept., 1 Mar 64-1 Nov 65,
by R. Rosenzweig, and Z. F. Chang. Mar 66, 115p. Contract AF 33 (615)-1432, Proj. AF-4460, Task 446001,
AFAL TR-66-45
Unclassified report

Descriptors: (*Transistor amplifiers, Power amplifiers), (*Single sideband communication systems, Transistor amplifiers), Gain, Distortion, Electric properties, Design, Performance (Engineering), Packaging, Thermal properties, Very high frequency

The report describes the work performed in the development and fabrication of a linear amplifier transistor that achieved the contract goals of 50 watts PEP at 80 megacycles, with 10 dB power gain and -23 dB intermodulation distortion. The transistor has built-in second breakdown protection, which has been achieved by incorporating ballast resistance in each emitter site of the overlay structure. Furthermore, a temperature compensating diode has been placed inside the transistor package to provide Class AB bias point control. The package is a small, lightweight TO-60, with the emitter grounded to the case. The third terminal is used for the diode. The transistor is capable of dissipating in excess of 75 watts and has a typical thermal resistance of 2C/watt. (Author)

AD-629 274 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
REFINEMENT OF NAFI THIN FILM PRODUCTION TECHNIQUES.
Final rept.,
by Clifford M. Ault. 31 Dec 65, 30p. Rept. no. NAFI-TR-752,
Unclassified report

Descriptors: (*Microminiaturization (Electronics), Films), (*Films, Vapor plating), (*Vapor plating, Films), Deposition, Vacuum apparatus, Processing, Semiconducting films, Metal films, Substrates, Temperature control, Cermets, Copper, Chromium, Silicon compounds, Oxides

Preparation of thin film electronic circuit panels by vacuum deposition is practical through both batch and In-Line machine processing. The feasibility of the thin film vacuum deposition technology employed by NAFI in the preparation of electronic circuit panels was demonstrated in both the batch and In-Line mode of operation. Although extensive thin film production refinement was accomplished, additional improvement of the evaporation mechanisms and controls are required to utilize fully the potential of the In-Line fabricating machinery and process. The recommendations embodied in the report represent recognition of inadequacies in the facilities which prevent process optimization. An extensive engineering analysis of the In-Line machine problems will be required to establish the scope of source redesign and control revisions necessary to attain the yield and reproducibility capabilities considered inherent with the technology employed. (Author)

AD-629 286 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
FAIRCHILD SEMICONDUCTOR DIV FAIRCHILD CAMERA AND INSTRUMENT CORP MOUNTAIN VIEW CALIF
PRODUCTION ENGINEERING MEASURE FOR IMPROVEMEMENT OF PRODUCTION TECHNIQUE TO INCREASE THE RELIABILITY FOR PNP INTERMEDIATE POWER SILICON PLANAR SWITCHING TRANSISTORS INCLUDING 2N3502.
Quarterly progress rept. no. 3, 1 Jul-30 Sep 65,
by W. McKeown, J. Diepeveen, N. Walker, D. Floydand , and G. Potts. 30 Sep 65, 31p. Contract DA-36-039-AMC-06155 (E)
Unclassified report

See also AD-622 821.

Descriptors: (*Transistors, Manufacturing methods), Reliability (Electronics), Silicon, Electronic switches, Processing, Ceramic coating, Jigs, Life expectancy, Tests, Performance (Engineering)

Since the first report, a number of parameters controlling the growth of silicon dioxide have been investigated in more detail. This has led to a temperature control technique problem and to the discovery of very fine surface pitting of the silicon, which is peculiar to oxide deposition by this technique. Investigation of the latter difficulty, which has caused a good deal of concern, and the development of a temperature control technique during oxide deposition, have caused the project to be about one month behind schedule. However, these divergencies from the original PERT were not foreseen and the delay is considered reasonable. (Author)

AD-629 287 Fld. 9/1, 13/8
CFSTI Prices: HC $3.00 MF $0.75
ITT ELECTRON TUBE DIV EASTON PA
PRODUCTION ENGINEERING MEASURE FOR A PHASE II SUPER POWER HYDROGEN THYRATRON TUBE.
Progress rept. nos. 10, 11, 12, 13, 14, 7 Jun 64-6 Sep 65,
by H. E. Krefft. 6 Sep 65, 66p. Contract DA-36-039-sc-85985,
Unclassified report

See also AD-608 555.

Descriptors: (*Thyratrons, Hydrogen), Manufacturing methods, Performance (Engineering), Electron tube parts, Electrodes, Test method, Life expectancy, Design

During the quarterly periods covered by this report, the Phase II test modulator was completely assembled and initial operating difficulties evident during this time were overcome. As a result, the program which had been delayed by lack of this test facility was finally able to proceed and tests and evaluation of three prospective pre-production tubes were carried out. These tests show that the voltage and power capability of the original design 'A' of the 8301/KU275 tube may have limitations at the level prescribed in Specification SCL-7001/60. At a repetition rate of 4000 pps, maximum attainable power was 128 KW at epy=40 KV, Ib=6.4 Adc. Evaluation of the test material leads to the conclusion that this limited performance is primarily due to insufficient recovery and relatively poor hold-off in the discharge gaps which could be improved by changing the grid structures. No evidence was found of detrimental thermal effects at, or mechanical failure of, the grids. The program for the continuation of work on this contract is, therefore, aimed at the optimization of the grid structures and improved processing of the tubes during construction and aging. As a back-up program, if operation at full specified power and voltage cannot be achieved with thiese improvements in design 'A', the merits of adding a third gap to this design will be investigated. (Author)

AD-629 385 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
GENERAL ELECTRIC CO IRMO S C ELECTRONIC SPECIALTY CAPACITOR BUSINESS SECTION
PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF HERMETICALLY SEALED TANTALUM FOIL CAPACITORS.
Quarterly rept. no. 1, 20 Sep-20 Dec 65,
by R. M. Trewhella. 20 Dec 65, 21p. Contract DA-36-039-AMC-06169 (E),
Unclassified report

Descriptors: (*Tantalum capacitors, Manufacturing methods), Reliability (Electronics), Foils, Hermetic seals, Welding

A 2.7.4 Fractional Factorial Experimental Design was selected for the evaluation of seven product design and modification factors. The special units were designed and the fabrication was started on all sixty-four lots while fourteen production lots completed manufacturing during this period. The evaluation program on the heliarc weld process resulted in a complete revision of a weld stations and the installation of an electrode positioner and support fixture with improved operator control. (Author)

AD-629 386 Fld. 9/1
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
SECONDARY BREAKDOWN THERMAL CHARACTERIZATION AND IMPROVEMENT OF SEMICONDUCTOR DEVICES.
Technical rept.,
by Bernard Reich, and Edward B. Hakim. Nov 65, 19p. Rept. no. ECOM-2648,
Proj. DA-1P6-22001-A 056, Task 1P6-22001-A056-01,
Unclassified report

Descriptors: (*Semiconductor devices, Failure (Mechanics)), Dielectric properties, Transistors, Diodes (Semiconductor), Transients, Thermal properties, Resistance (Elec-

trical), Voltage, Electric currents, Avalanche diodes, Test methods

The report indicates that the energy dependence of semiconductor devices with respect to secondary breadkown can be explained on the basis of transient thermal resistance. A new method of measuring transient thermal resistance in the avalanche mode will be described as well as the resultant characteristics. The results indicate that the thermal time constants of transistors is much shorter than heretofore recognized. A similar exercise will be presented for voltage regulator diodes. In addition, a simple technique will be described which significantly increases the thermal time constant of these devices. Similar changes are envisioned for other semiconductor devices. (Author)

AD-629 434 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
BULOVA WATCH CO WOODSIDE N Y ELECTRONICS DIV
PRODUCTION ENGINEERING MEASURE FOR TYPE CR- (XM-60)/U CRYSTAL UNITS.
Quarterly rept. no. 5, Jul-Sep 65,
by G. A. LaGasse. Sep 65, 46p. Contract DA-36-039-AMC-03633 (E),
Unclassified report

See also AD-621 896.

Descriptors: (*Quartz resonators, Manufacturing methods), (*Crystal holders, Quartz resonators), Low frequency, Copper, Electric wire, Welding, Ultrasonic radiation, Processing, Etched crystals, Performance (Engineering), Life expectancy, Reliability (Electronics), Electrical properties

Problems encountered in usage of available Kold-Weld holders are detailed, along with progress in ultra sonic lead attachment. Complete data and evaluation of the CR-47A/U units are presented. (Author)

AD-629 502 Fld. 9/1
ARMY ELECTRONICS LABS FORT MONMOUTH N J
MODES IN RADIAL WAVE BEAM RESONATORS.
Revised ed.,
by G. Goubau, and F. Schwering. 3 Aug 65, 8p.
Unclassified report

Revision of manuscript submitted 1 Jun 65.

Availability: Published in IEEE Transactions on Microwave Theory and Techniques vMTT-13 n6 p749-55 Nov 1965. Copies to DDC users only.

Descriptors: (*Cavity resonators, Field theory), Propagation, Potential theory, Waveguides, Mathematical analysis

Resonant modes in ring shaped resonators formed by a reflector strip bent into a circle are discussed here. These modes are derived by superimposing two radially propagating wave beams, one converging toward the resonator axis, the other one diverging from this axis. The condition for resonance leads to an integral equation whose eigenfunctions describe the field distribution at the reflector strip and whose eigenvalues determine the diffraction loss due to the fraction of energy bypassing the reflector. The approximations made in deriving the radial beam mode system are equivalent to those used for the derivation of the axial beam mode system in a Fabry-Perot resonator. Within the limits of these approximations the kernel of the integral equation for a ring resonator is of the same form as the kernel of the integral equation for a parallel strip resonator. If in the radial case the reflector strip is also curved within the axial planes with a radius of curvature equal to the diameter of the reflector ring, and if the width of the reflector strip is sufficiently large, the axial field distribution of the modes is described by Gauss-Hermite functions. The Q of the ring resonator is determined by the diffraction loss and by reflector loss caused by the finite conductivity of the reflector. Formulas for the corresponding Q-values are derived. A numerical evaluation shows that in the microwave region Q-values of the order of 1,000,000 are feasible. (Author)

AD-629 571 Fld. 9/1, 9/5
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
THE 'HOUR-GLASS' ENERGY DIVERTER.
Technical rept.,
by Sol Schneider, and Anthony J. Buffa. Jan 66, 29p. Proj. AF-1P6-22001-A-055, Task 1P6-22001-A-05502,
ECOM 2654
Unclassified report

Descriptors: (*Microwave equipment, Safety devices), (*Trigger circuits, Microwave equipment), Modulators, Voltage, Capacitors, Resistors, Configuration, Performance (Engineering), Design

A new spark-gap array for energy diverter usage was studied. The physical appearance of this array is that of an 'hour-glass.' This type of energy diverter is basically simple to construct and has excellent inherent high-voltage shielding properties. It has an infinite operating range, requires very low trigger energy (< 0.1 joule), fires very rapidly (< 0.1 microsecond), and requires no series inductance. Two triggeringsequence modes were investigated; and 'increasing overvoltage' mode and a 'constant overvoltage' mode. The design requirements for each triggering-sequence mode are discussed, and experimental results are presented. The effect of trigger polarity, electrode geometry, and use of a sharpening gap in series with the trigger generator is discussed. (Author)

AD-629 631 Fld. 9/1, 9/3
CFSTI Prices: HC $2.00 MF $0.50
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
VARACTOR-TUNED FILTERS AT MICROWAVE FREQUENCIES.
Technical memo.,
by Roger L. Fjerstad. 15 Dec 65, 46p. Rept. no. EDL-M928,
Contract DA-28-043-AMC-00379 (E),
Unclassified report

Descriptors: (*Filters (Electromagnetic wave), Tuned circuits), (*Varactor diodes, Filters (Electromagnetic wave)), (*Tuned circuits, Filters (Electromagnetic wave)), Microwaves, Bandpass filters, Cavity resonators, Theory, Mathematical analysis, Diodes (Semiconductor), Bandwidth, Control, Transmission lines, Partial differential equations

The unloaded Q of a varactor-tuned cavity is derived from a solution of Maxwell's equation. The derivation takes into account the Q multiplying properties of a length of transmission line loaded with a varactor. An equation is written which relates the tuning range of a cavity length for a given ratio of maximum to minimum varactor capacitance. The equation was solved on a computer and the results are given in graphical form. Using the general Q equation, a plot is made of Q multiplication factor as a function of cavity length. These results, in graphical form, can be used to determine the maximum unloaded Q obtainable over a given tuning range for a varactor of known cut-off frequency and capacitance. Two types of varactor-tuned TEM cavities are discussed and design procedures given. Methods of controlling bandwidth over a tuning range are discussed for both bandpass and bandstop filters. (Author)

AD-629 717 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
FAIRCHILD SEMICONDUCTOR DIV FAIRCHILD CAMERA AND INSTRUMENT CORP MOUNTAIN VIEW CALIF
PRODUCTION ENGINEERING MEASURE FOR IMPROVEMENT OF PRODUCTION TECHNIQUE TO INCREASE THE RELIABILITY FOR PNP INTERMEDIATE POWER SILICON PLANAR SWITCHING TRANSISTORS INCLUDING 2N3502.
Quarterly progress rept. no. 4, 1 Oct-31 Dec 65,
by J. Knudsen, J. Diepeveen, N. Walker, D. Floyd, and A. Schifrin. 31 Dec 65, 38p. Contract DA-36-039-AMC-06155 (E),
Unclassified report

See also AD-629 286.

Descriptors: (*Transistors, Manufacturing methods), Reliability (Electronics), Silicon, Electronic switches, Processing, Ceramic coatings, Jigs, Life expectancy, Tests, Performance (Engineering)

Work specified for completion by the end of this report period includes sending a series of runs of 3517 material (silicon, epitaxial wafers used to make 2N3502 transistors) to the process development line for evaluation. Preliminary results indicated mixed findings with some of the material producing bad devices; however, overall indications were favorable. The cause for the defective devices was not established. It was decided to produce two more runs of 50 slices each -- 50 slices with 10,000A of SiO2, and 50 slices with an initial coating of 1,000A of deposited oxide. The latter was subsequently thermally oxidized to provide an overall oxide thickness of 10,000A. Both groups of material are in the process of being thoroughly evaluated by the process development group. At the present, it is felt that the deposition of a thick layer of SiO2 on silicon is not conducive to present production epi systems, since the residues of the process pose a major cleaning problem. A thin passivating layer of 1000A seems to be the best alternative.

AD-629 718 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
CLEVITE CORP BEDFORD OHIO PIEZOELECTRIC DIV
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS.
Quarterly rept. no. 11, 30 Sep-29 Dec 65,
by A. Lungo. 29 Dec 65, 23p. Contract DA-36-039-AMC-01471 (E),
Unclassified report

Descriptors: (*Radiofrequency filters, Ceramic materials), (*Ceramic materials, Filters (Electromagnetic wave)), (*Filters (Electromagnetic wave), Ceramic materials), Resonators, Manufacturing methods, Piezoelectric crystals, Tuning devices, Processing, Test equipment

During this period small production lots of ceramic disks were successfully processed into tuned 4.3 Mc and 6.0 Mc resonators with the production fixtures developed under this contract. Also, because of the low yield encountered, effort was directed toward the development of faster means of sorting resonators into groups with more restricted bandwidth and frequency characteristics. (Author)

AD-628 886 See Fld. 9/3

AD-628 921 See Fld. 9/3

AD-629 048 See Fld. 20/12

AD-629 125 See Fld. 9/5

AD-629 339 See Fld. 9/5

AD-629 439 See Fld. 11/7

AD-629 516 See Fld. 17/2

AD-629 523 See Fld. 20/8

AD-629 537 See Fld. 20/9

AD-629 601 See Fld. 17/9

AD-629 733 See Fld. 11/9

9/2. COMPUTERS

AD-628 909 Fld. 9/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
MATRIX CRITERIA FOR ARBITRARY RELIABILITY IN ITERATED NEURAL NETS.
Physical and mathematical sciences research papers, (revised ed.),
by Rocco H. Urbano. 1 Feb 65, 9p. Rept. no. AFCRL-PMSRP-175 ,AFCRL-65-876
Proj. AF-5632, Task 563202,
Unclassified report

Revision of manuscript submitted 10 Jan 65.

Availability: Published in IEEE Transactions on Electronic Computers vEC-14 n4 p627-9 Aug 1965. Copies to DDC users only.

Descriptors: (*Computer logic, Reliability), (*Matrix algebra, Computer logic), Polynomials, Iterative methods, Reliability (Electronics)

In a previous paper by this author, the problem of achieving arbitrary reliability for combinatorial nets from arbitrarily unreliable elements was reduced to the study of the convergence properties of an associated polynomial system. In this paper simple criteria which specify the convergence of such a system to a nodal fixed point are obtained from known results in matrix theory. (Convergence to a nodal fixed point implies that the corresponding net approaches reliability arbitrarily near 1 for a particular function). Theorems are also given which show that it is possible to obtain from a single system converging to a nodal fixed point, many systems having this property. (Author)

AD-628 935 Fld. 9/2, 5/9
CFSTI Prices: HC $7.20 MF $2.00
MILITARY ACADEMY WEST POINT N Y
SEMINAR OF MILITARY COMPUTER EDUCATORS AND COMPUTER CENTER DIRECTORS, 1965, 419p.
Unclassified report

Proceedings of the Conference of Military Computer Educators (1st), conducted at the United States Military Academy 14-17 June 1965.

Descriptors: (*Computers, Education), (*Computer personnel, Training), (*Training devices, Computers), Symposia, Data processing systems, Military training, Teaching mechines, Computer operators

The objectives of the conference were to provide attendees an opportunity to accomplish all or part of the following desirable goals: (a) Coordinate programs of instruction, (b) Compare methods of computer instruction, (c) Reduce requirements for individual coordination visits, (d) Develop consistent philosophy toward computer education, (e) Determine level of computer knowledge desired of incoming students at all levels of military education, (f) Analyze service requirements for computer education and means of satisfying these requirements, (g) Identify specific areas of weakness and strength in computer programs now being implemented by participants, (h) Develop methods and techniques by which computers can contribute more effectively to the teaching of non-computer subjects, (i) Exchange information on audio-visual aids appropriate to computer and computer-aided instruction, (j) Assure that each receives maximum benefit from experiences of other military educational activities involved to varying degrees in computer and computer-aided instruction.

AD-629 096 Fld. 9/2, 20/13
CFSTI Prices: HC $3.00 MF $0.75
ILLINOIS UNIV URBANA DEPT OF PHYSICS
FORTRAN PROGRAMS FOR CRYOGENIC THERMOMETRY.
Technical rept.,
by Richard E. Harris. Jan 66, 69p. Rept. no. tr-1.
Contract DA-ARO (D)-31-124-G343, Proj. AROD-2771-P,DA-20014501B11 AROD 2771:11
Unclassified report

Descriptors: (*Programming (Computers), Cryogenics), (*Cryogenics, Programming (Computers)), Calibration, Thermometers, Programming languages

Three FORTRAN language computer programs designed to analyze data for calibration of salt pill and resistance thermometers below 4.390K are described. The first calibrates a secondary paramagnetic salt pill thermometer using helium vapor pressure to determine the temperature. The second program calculates a secondary resistance thermometer using both the vapor pressure of helium and the mutual inductance of a previously calibrated salt pill as standards. Following calibration, an analytic function giving temperature in terms of resistance is produced using the technique of least squares curve fitting. The third program is like the second, except that the analytic function is not determined. (Author)

AD-629 222 Fld. 9/2
CFSTI Prices: HC $1.00 MF $0.50
RAND CORP SANTA MONICA CALIF
JOHNNIAC EULOGY,
by Willis H. Ware. Mar 66, 15p. Rept. no. P-3313,
Unclassified report

Descriptors: (*Computers, History), (*Data processing systems, History), Magnetic core storage, Input-output devices, Punched cards, Programming (Computers)

Text of talk presented at the decommissioning ceremonies for the computer operated at Rand Corporation between 1953 and 1966. JOHNNIAC was one of the family of computers developed from the von Neumann machine, the machine, in turn, developed at Princeton's Institute for Advanced Study. From the JOHNNIAC there was developed JOSS, the JOHNNIAC Open-Shop System. The ceremonies were held at the Rand Corporation, 18 Feb 1966. JOHNNIAC will be placed in the Los Angeles County Museum.

AD-629 278 Fld. 9/2, 5/10
CFSTI Prices: HC $2.00 MF $0.75
DARTMOUTH COLL HANOVER N H
NOTES ON THE MULTIDIMENSIONAL SCALING OF ELASTIC DISTANCES,
by Victor E. McGee. Jan 66, 46p. Contract Nonr-3897 (05),
Unclassified report

Descriptors: (*Psychometrics, Programming (Computers)), (*Programming (Computers), Psychometrics), Programming languages

AD-629 327 Fld. 9/2, 12/1
CFSTI Prices: HC $1.60 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
SQUARE ROOT SUBROUTINES.
Technical note,
by Herbert Hilton, and Helen Mark. Nov 54, 17p. Rept. no. TN-963,
Proj. DA-503-06-002 ,TB3-0007K
Unclassified report

Descriptors: (*Programming (Computers), Numerical methods and procedures), (*Numerical methods and procedures, Programming (Computers)), Compilers, Control sequences

The mathematical method, logical flow charts, and the ORDVAC and EDVAC coding for the square root subroutines are presented in this report. (Author)

AD-629 346 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J
DISTRIBUTED EXECUTIVE CONTROL IN A CLASS OF MODULAR MULTIPROCESSOR COMPUTING SYSTEMS VIA A PRIORITY MEMORY.
Technical rept.,
by Robert M. Dunn, John C. Gallagher, and David R. Hadden,Jr.. Jan 66, 27p. Rept. no. ECOM-2663,
Proj. DA-1X6-40603-D-494, Task 03,
Unclassified report

See also AD-625 859.

Descriptors: (*Digital computers, Control sequences), (*Data processing systems, Control sequences), (*Control sequences, Data processing systems), Command + control systems, Computer logic, Modules (Electronics)

An approach to distributed executive control in a saturation processing network is proposed using a Priority Memory (PRIME) at the switching points in the network. An analysis of the control problem is performed to derive the characteristics of the PRIME. A discussion of the relative advantages and disadvantages of this approach is given. Implementation schemes, to the detail logic design, are presented based on associative memory approach. (Author)

AD-629 361 Fld. 9/2, 17/2
CFSTI Prices: HC $2.00 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
A COMPUTER FOR VOCODER PITCH EXTRACTION.
Technical note,
by N. L. Daggett. 18 Feb 66, 30p. Rept. no. TN-1966-3,
Contract AF 19 (628)-5167, Proj. AF-649L, ESD TDR-66-45
Unclassified report

Descriptors: (*Special purpose computers, Pitch discrimination), (*Pitch discrimination, Voice communication systems), Integrated circuits, Analog-digital computers, Speech, Decision theory

A small, integrated-circuit computer has been designed to perform vocoder pitch extraction as a part of the Lincoln Experimental Terminal. The computer operates on the peaks of an incoming speech signal using hybrid analog-digital techniques and computes at three millisecond intervals (1) an 8-bit binary word measuring pitch period to the nearest 80 mu sec increment and (2) a binary decision indicating whether the incoming signal is voiced or unvoiced. (Author)

AD-629 371 Fld. 9/2
WESTINGHOUSE ELECTRIC CORP BALTIMORE MD
A UNIVERSAL ASSEMBLY MAPPING LANGUAGE; 19.1,
by M. L. Graham, and P. Z. Ingerman. 1965, 15p. Contract AF 49 (638)-1452, AFOSR 65-2685
Unclassified report

Availability: Published in Proceedings of the National Conference (20th) Association for Computing Machinery, Session 19: Programming Languages for Non-Numeric Processing-2 p409-21 Aug 26 1965. Copies to DDC users only.

Descriptors: (*Programming languages, Design), Compilers, Numbers, Computer logic

The meta-language presented is entirely devoid of machine-oriented mnemonic codes. The user must use the metalanguage to define the meanings of the set of machine-oriented mnemonic codes which he wishes to use. The assembly language itself does not exist. A source program in the assembly language which the user specified is presented to the meta-language processor together with the description of this language in terms of the metalanguage. The processor then interprets the source code in terms of the description it has been given and generates output in the form specified by the user in his meta-language description. (Author)

AD-629 494 Fld. 9/2
CFSTI Prices: HC $6.00 MF $1.25
MASSACHUSETTS INST OF TECH CAMBRIDGE
PROJECT MAC; PROGRESS REPORT II: JULY 1964 TO JULY 1965.
Annual progress rept.
1 Jul 65, 211p. Rept. no. MAC-PR-2,
Contract Nonr-4102 (01) Proj. NR-048-189,
Unclassified report

Descriptors: (*Computers, Man machine systems), Information retrieval, Data transmission systems, Teaching machines, Artificial intelligence, Time

The broad goal of Project MAC is experimental investigation of new ways in which on-line use of computers can aid people in their individual work; whether research, engineering design, management, or education. (Author)

AD-629 586 Fld. 9/2, 20/6
CFSTI Prices: HC $2.60 MF $0.50
GENERAL ELECTRIC CO SYRACUSE N Y ELECTRONICS LAB
MAGNETO-OPTICAL DISPLAY PANEL WITH MEMORY.
Quarterly rept. no. 1, 1 Jul-30 Sep 65,
by J. E. Eide, R. E. Glusick, L. E. Somers, and H. F. Windsor. Jan 66, 24p. Contract DA-28-043-AMC-01442 (E) Proj. DA-1X6-40603, ECOM 01442-1
Unclassified report

Descriptors: (*Magneto-optic effect, Display systems), (*Computer storage devices, Thin films (Storage devices)), Ferromagnetic materials, Nickel, Iron, Colloids, Films, Magnetite

The program is based upon Bitter solution overlays on electrodeposited NiFe magnetic films. This results in a magnetically rotatable grating on the film which can be optically interrogated. Useful and moderately efficient films were produced, electronic address, write and erase circuitry were evolved, and a coincident current writing at the required spatial density was demonstrated. A number of potential problems were recognized and future effort was planned accordingly. (Author)

AD-629 729 Fld. 9/2
CFSTI Prices: MF $1.50
DEPARTMENT OF DEFENSE WASHINGTON D C
COBOL, EDITION 1965.
1965, 313p.
Unclassified report

Availability: Available from Superintendent of Documents, GPO, Washington, D. C. 20402, HC $1.75.

Descriptors: (*Programming languages, Specifications), History

Contents: History of CODASYL COBOL development; philosophy of COBOL use as a programming language; total CODASYL COBOL language specifications.

AD-628 900 See Fld. 15/5

AD-628 926 See Fld. 5/1

AD-628 953 See Fld. 5/9

AD-629 042 See Fld. 12/1

AD-629 047 See Fld. 3/1

AD-629 055 See Fld. 13/7

AD-629 130 See Fld. 3/1

AD-629 225 See Fld. 5/2

AD-629 351 See Fld. 15/7

AD-629 354 See Fld. 17/2

AD-629 368 See Fld. 6/4

AD-629 387 See Fld. 14/2

AD-629 455 See Fld. 5/7

AD-629 606 See Fld. 5/2

AD-629 692 See Fld. 5/7

AD-629 739 See Fld. 8/11

9/3. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-628 886 Fld. 9/3, 9/1, 20/12
CFSTI Prices: HC $7.60 MF $0.75
RADIO CORP OF AMERICA CAMDEN N J
RANDOM ACCESS CONTROL OF ELECTROLUMINESCENT ELEMENTS.
Final rept. Jun 64-Jun 65,
by Gary Zin, and Frank Hinnenkamp. Jan 66, 78p. Contract AF 30 (602)-3480, Proj. AF-5597, Task 559701,
RADC TR-65-337
Unclassified report

Descriptors: (*Electroluminescence, Display systems), (*Display systems, Electronic switches), (*Cadmium alloys, Selenium alloys), Photoelectric materials, Control systems, Data storage systems, Hysteresis, Powders, Semiconductors, Electrical properties, Brightness, Synthesis (Chemistry), Processing, Doping

Cadmium selenide (CdSe) switches were devised to control the luminous emittance of electroluminescent cells in a solid-state display. The technique employed makes use of the hysteresis in CdSe to change the resistance of the material to some low value when a switching voltage is applied. The purpose of this contract was to establish the feasibility of utilizing the hysteretic effect in cadmium selenide to provide switching and storage to an array of electroluminescent cells by investigating the cadmium selenide material, by studying panel structure, and by investigating the addressing of large arrays of these elements. The CdSe material preparation process was varied and the corresponding effects on performance were determined. The physical characteristics of the display panel itself were determined not to possess any properties which might prohibit the use of this technique for large-area displays. Finally the necessary components in any addressing scheme were outlined. The primary problems with this technique are in the area of reproducibility, caused largely by the nonuniformities present in the CdSe material properties. Recommendations for improving the uniformity of the CdSe material were included. (Author)

AD-628 921 Fld. 9/3, 9/5, 9/1
CFSTI Prices: HC $5.60 MF $0.50
NEW YORK UNIV N Y LAB FOR ELECTROSCIENCE RESEARCH
INVESTIGATION OF NETWORK REALIZABILITY.
Final rept., 1 Apr 62-31 Oct 65,
by Mohammed S. Ghausi. 31 Oct 65, 53p. Contract AF 19 (628)-379, Proj. AF-5628, Task 562806,
AFCRL 65-884
Unclassified report

Descriptors: (*Networks, Scientific research), Reports, Abstracts, Design, Microminiaturization (Electronics), Parametric amplifiers, Converters, Synthesis, Analysis, Frequency converters, Integrated circuits

The study covered four areas of investigation; namely: Analysis and synthesis of distributed RC networks; Theory and design of frequency converters using combinations of parametric elements; Design of active RC networks for microelectronics; and miscellaneous topics in network theory. The report briefly summarizes these investigations, and lists all publications which have resulted from themincluding scientific reports (with abstracts) published for the Air Force and papers published in the professional journals. (Author)

AD-629 057 Fld. 9/3, 12/2
STATE UNIV OF NEW YORK STONY BROOK DEPT OF ELECTRICAL ENGINEERING
ON THE RELATIVE TIME OF ADAPTIVE PROCESSES.
Revised ed.,
by Sheldon S. L. Chang. 9 Sep 64, 9p. Contract AF-AFOSR-542-64, Proj. AF-9749, Task 974901,
AFOSR 65-2145
Unclassified report

Revision of manuscript submitted 9 Jul 64.

Availability: Published in IEEE Transactions on Automatic Control, vAC10 n1 p11-7 Jan 1965. Copies to DDC users only.

Descriptors: (*Adaptive control systems, Performance (Engineering)), Optimization, Operations research, Time

Adaptive control systems can be classified according to the response time of the adaptive loop T sub a relative to that of the main servo loop T sub m. The response time T sub a cannot be smaller than the time needed for making the required measurement on which the adjustments are based. In a slow adaptive system, T sub a >> T sub m, and the adjustments are made according to the estimated situation or performance. If T sub a << T sub m, usually a reference model is chosen and the system is forced to conform to the reference model. Sometimes the reference model is dimensionless so that the fastest response can be obtained. In both cases, T sub a >> T sub m and T sub a << T sub m, the system can be analyzed by introducing suitable approximations. The condition of stability for the adaptive loop is derived in general terms. If T sub a nearly equals T sub m, both analysis and synthesis become difficult. The concept of 'dual control' is introduced, but not developed in the paper. (Author)

AD-629 484 Fld. 9/3, 20/12, 9/4
CFSTI Prices: HC $6.60 MF $0.75
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
SEMIANNUAL PROGRESS REPORT NO. 70, JANUARY 1, 1965-JULY 1, 1965.
Nov 65, 64p. Contract Nonr-1866 (07),Nonr-1866 (16)
Unclassified report

Descriptors: (*Solid state physics, Scientific research), (*Control systems, Scientific research), (*Information theory, Scientific research), (*Electromagnetic waves, Propagation), Very low frequency, Automatic, Control, Adaptive control systems, Communica-

tion systems, Microwave equipment, Ferromagnetic materials, Ferroelectric materials

Contents: Very low frequency propagation; Electron and solid state physics; Automatic control; Communications and networks; Microwave application of ferromagnetic and ferroelectric materials; and electromagnetic radiation.

AD-629 664 Fld. 9/3
NORTHWESTERN UNIV EVANSTON ILL INFORMATION-PROCESSING AND CONTROL SYSTEMS LAB
DELTA MODULATION IN FEEDBACK CONTROL SYSTEMS,
by G. J. Murphy, and G. Shuraym. 1964, 6p.
Contract AF-AFOSR-270-63,
AFOSR 65-2348
Unclassified report

Availability: Published in Proceedings of the National Electronics Conference, v21 p609-12 1965. Copies to DDC users only.

Descriptors: (*Control systems, Feedback), (*Modulation, Control systems), (*Data transmission systems, Modulation), Design, Analysis, Electronics, Theory, Demodulation

The purpose of this paper is to demonstrate that techniques that have previously been used for the analysis and the design of feedback control systems can be employed successfully also in the analysis and the design of delta-modulation data-transmission systems. It was shown that a delta-modulation data -transmission system is equivalent to a single-loop sampled-data relay control system in the absence of disturbances. The model of such a system is shown. In addition, it was stated that systems of this kind can not, in general, be made stable in the sense of Liapunov merely by appropriate choice of G (s) and H (s), and that, for such a system to be asymptotically stable in the sense of Lagrange, in the absence of an input signal, it is necessary and sufficient that all of the poles of sG (s)H (s) have negative real parts.

AD-629 691 Fld. 9/3, 12/2
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
ON THE FORMULATION OF ADAPTIVE OPTIMAL CONTROL PROBLEMS,
by A. E. Pearson, and P. E. Sarachik. 6 Mar 65, 12p. Contract AF-AFOSR-284-63,
AFOSR 65-2430
Unclassified report

Prepared in cooperation with Brown Univ., Providence, R. I. Div. of Engineering, Grant NSF-G14514.

Availability: Published in Journal of Basic Engineering Mar 1965. Copies to DDC users only.

Descriptors: (*Optimization, Adaptive control systems), (*Adaptive control systems, Optimization), Nonlinear systems, Dynamics, Integral transforms

The paper relates to an approach introduced by Kulikowski for adaptive optimal control of nonlinear systems. In this approach, the plant dynamics are represented symbolically by an operator which transforms or maps input time functions into corresponding output time functions. The contributions of the paper arise mainly from the physical comnsiderations associated with such an operator representation, specifically the memory of the plant, and the influence of these considerations upon the formulation. It is shown that the optimal control problem may be formulated in various ways for a given plant and given performance criteria depending upon how the memory of the plant is taken into account. (Author)

AD-628 907 See Fld. 9/1

AD-629 271 See Fld. 12/2

AD-629 442 See Fld. 9/5

AD-629 476 See Fld. 10/2

AD-629 562 See Fld. 10/2

AD-629 596 See Fld. 9/5

AD-629 631 See Fld. 9/1

AD-629 743 See Fld. 9/5

AD-629 752 See Fld. 14/2

9/4. INFORMATION THEORY

AD-628 929 Fld. 9/4, 20/10
CFSTI Prices: HC $3.00 MF $0.75
SYRACUSE UNIV RESEARCH INST N Y
DUALITY AND INFORMATION COMPONENTS IN FOURIER TRANSFORMS.
Technical rept.,
by Stanford Goldman. Jan 66, 83p. Rept. no. EE-449-661-T-9,TR-9
Contract Nonr-669 (10), Proj. NR-049-117,
Unclassified report

Descriptors: (*Integral transforms, Information theory), (*Information theory, Integral transforms), (*Quantum mechanics, Information theory), Statistical functions

This paper considers signals or waveshapes in terms of their information components and considers the dual representation of signals in Fourier transform domains. Certain duality aspects between Fourier series and sampling theorem expansions are discussed. The duality between linear transmission and analytic signal modulation is pointed out, of which, the duality between distortions echoes in the time domain and sidebands in the frequency domain is a particular example. It is shown that sampling theorem expansions can be expressed in terms of distortion echoes of the elementary function delta (t-t') and also in terms of sidebands of the elementary function e (j2 pi ft). Relations between waveshape properties in the time and frequency domains are considered from several points-of-view and new insight is thereby gained. The relation between the autocorrelation function and intersymbol influence is analyzed, and the importance of phase distortion echoes, previously ignored in this connection, is pointed out. Finally, there is a discussion of the relations between signal structure and resolution. In the appendices, certain characteristics of analytic signals and Hilbert transforms which are of interest in modulation theory are derived. Some of these the writer has not been able to find in previous literature. (Author)

AD-628 956 Fld. 9/4
CFSTI Prices: HC $10.60 MF $0.75
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
CONCATENATED CODES.
Technical rept.,
by G. David Froney,Jr.. 1 Dec 65, 109p. Rept. no. TR-440,
Contract DA-36-039-AMC-03200 (E) ,NSF-GP-2495
Unclassified report

Doctoral thesis.

Descriptors: (*Coding, Optimization), Mathematical analysis, Decoding, Errors

Concatenation is a method of building long codes out of shorter ones; it attempts to meet the problem of decoding complexity by breaking the required computation into manageable segments. Theoretical and computational results are presented bearing on the efficiency and complexity of concatenated codes; the major theoretical results are the following: (1) Concatenation of an arbitrarily large number of codes can yield a probability of error that decreases exponentially with the overall block length, while the decoding complexity increases only algebraically; and (2) Concatenation of a finite number of codes yields an error exponent that is inferior to that attainable with a single stage, but is nonzero at all rates below capacity. Computations support these theoretical results, and also give insight into the relationship between modulation and coding. This approach illuminates the special power and usefulness of the class of Reed-Solomon codes. The author gives an original presentation of their structure and properties, from which he derives the properties of all BCH codes; he determines their weight distribution, and considers in detail the implementation of their decoding algorithm, which he has extended to correct both erasures and errors and has otherwise improved. He shows that on a particularly suitable channel, RS codes can achieve the performance specified by the coding theorem. Finally, he presents a generalization of the use of erasures in minimum-distance decoding, and discusses the appropriate decoding techniques, which constitute an interesting hybrid between decoding and detection. (Author)

AD-629 369 Fld. 9/4
STANFORD UNIV CALIF DEPT OF ELECTRICAL ENGINEERING
THE DETECTION OF KNOWN SIGNALS IN COLORED GAUSSIAN NOISE,
by Thomas Kailath. 1965, 8p. Contract AF 49 (638)-1517,Nonr-225 (83)
AFOSR 65-2356
Unclassified repon

Availability: Published in Proceedings of the National Electronics Conference v21 p650-5 1965. Copies to DDC users only.

Descriptors: (*Information theory, Signals), Noise (Radio), Noise (Radar), Statistical processes, Functional analysis, Integral equations

The use of the Karhunen-Loeve method provides an elegant solution for the problems of the detection of known signals in colored Gaussian noise. Nevertheless it introduces certain complications because the expansion is an infinite-series expansion: questions of convergence and interchange of order of integration. The resolution of these problems is difficult and has led (when the K-L expansion is used) to the introduction of subsidiary conditions whose physical meaning is often unclear. A method of reducing the detection problem to a finite -dimensional form is presented where many of the difficulties with the infinite-series K-L expansion do not arise. The resulting simplicity provides more direct derivations of and more physical insights into the earlier results. It has also suggested some new results.

AD-629 408 Fld. 9/4, 17/2
PRINCETON UNIV N J
APPLICATION OF THE MAXIMUM PRINCIPLE TO THE DESIGN OF MINIMUM BANDWIDTH PULSES.
Revised ed.,
by D. M. Ditoro, and K. Steiglitz. 21 Jun 65, 6p.
Contract DA-31-124-ARO (D)-292 ,NSF-GP-579
AROD 5105:2
Unclassified report

Revision of manuscript submitted 29 Mar 65.

Availability: Published in IEEE Transactions on Communication Technology vCOM13 n4 p433-8 Dec 1965. Copies to DDC users only.

Descriptors: (*Pulse communication systems, Information theory), (*Information theory, Pulse communication systems), Bandwidth, Electromagnetic pulses, Optimization, Calculus of variations, Wave functions

The minimum bandwidth pulse for a given rms value and peak amplitude is found using the Pontryagin Maximum Principle for bounded phase space. The solution is obtained by actually solving

the equations of the maximum principle rather than by a verification of a solution arrived at by other means. The resulting optimal pulse shape can be used for comparisons with more easily generated pulses, and may be considered to be the optimal modification of a rectangular pulse from the point of view of minimum bandwidth. Pulses of this sort are useful in pulse communication systems. (Author)

AD-629 409 Fld. 9/4
PRINCETON UNIV N J
ADAPTIVE SIGNAL RECONSTRUCTION,
by S. A. Tretter, and K. Steiglitz. 1965, 6p. Contract DA-31-124-ARO (D)-292 ,NSF-GP-579

AROD 5105:3

Unclassified report

Availability: Published in Proceedings of the National Electronics Conference v21 p487-92 1965. Copies to DDC users only.

Descriptors: (*Adaptive systems, Signal generators), (*Signal generators, Adaptive systems), Filters (Electromagnetic wave), Wave analyzers, Waveform generators, Data processing systems, Sampling

An adaptive filter which reconstructs a continuous signal from its samples is described. This filter is based on the minimum mean-square-error reconstruction filter, assuming an all-pole model for the sampled spectral density of the input signal. The use of this model leads to two important simplifications. First, simple linear regression can be used to identify the unknown parameters of the signal spectral density. Second, the resulting filter has an impulse response which is of finite duration. These simplifications lead to an adaptive filter which is at the same time both generally applicable and easily implemented on a digital or hybrid computer. Experiments with both deterministic and random inputs are described which show that the adaptive filter yields significant improvement over a linear point connector or other commonly used reconstructors with relatively low order models and with relatively short identification times. (Author)

AD-629 539 Fld. 9/4
CFSTI Prices: HC $2.00 MF $0.50
PARKE MATHEMATICAL LABS INC CARLISLE MASS
THE SARDINAS/PATTERSON AND LEVENSHTEIN THEOREMS,
by John A. Riley. Nov 65, 33p. Rept. no. Scientific-5,
Contract AF 19 (628)-3826, Proj. AF-5628,
Task 562801,
AFCRL 66-25

Unclassified report

Descriptors: (*Theorems, Coding), (*Coding, Theorems), Algorithms

AD-628 926 See Fld. 5/1

AD-628 955 See Fld. 12/2

AD-629 354 See Fld. 17/2

AD-629 367 See Fld. 5/2

AD-629 484 See Fld. 9/3

9/5. SUBSYSTEMS

AD-628 943 Fld. 9/5
CFSTI Prices: HC $2.00 MF $0.50
HUGHES AIRCRAFT CO CULVER CITY CALIF RESEARCH AND DEVELOPMENT DIV
OPTIMIZATION OF GAIN ARBITRARY ARRAY ANTENNAS,
by A. T. Villeneuve. Dec 65, 46p. Rept. no. Scientific-5,P65-153
Contract AF 19 (628)-4349, Proj. AF-4600,
Task 460010,
AFCRL 66-67

Unclassified report

Descriptors: (*Antenna arrays, Gain), Optimization, Radiofrequency power, Admittance, Polarization

A technique was developed for optimizing under certain constraints, the power transferred from an arbitrary antenna array to a receiving antenna in some spatial direction. In certain practical cases this optimization reduces to that of maximizing directive gain; in others it reduces to optimizing the so called effective gain. The optimization technique is formulated for several of these cases and is applied to three numerical examples. (Author)

AD-629 125 Fld. 9/5, 9/1
CFSTI Prices: HC $2.60 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
LOW-LEVEL, CROSSED-FIELD NOISE STUDY.
Technical rept.,
by Joseph H. Hartley. Feb 66, 26p. Proj. DA-1P6-22001-A-055,
ECOM 2659

Unclassified report

Descriptors: (*Noise (Radio), Crossed field devices), (*Crossed field devices, Noise (Radio)), Medium frequency, High frequency, Oscillation, Electron tubes, Microwave equipment, Anodes (Electron tubes)

Experimental investigations of low-frequency electron tube noise are discussed. The work was done using experimental diodes with a coaxial configuration. The cathode is centrally located and surrounded by a concentric anode, split longitudinally into two equal sections. A magnetic field was applied colinear with the cathode. The investigation was confined to values of anode potential and magnetic field strength so that the experimental tubes were well beyond the Hull cut-off value at all times. The experiments were oriented primarily toward investigation of millivolt level oscillations in the frequency range of 0.5 to 10 megacycles. These oscillations are believed to be related in some manner to noise encountered in crossed-field microwave tubes. The mechanism of the oscillations is, as yet, unknown. (Author)

AD-629 148 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
ANTENNA STUDY FOR COVERT APPLICATIONS.
Technical memo.,
by Normand Barbano, and John E. Trollman. 24 Nov 65, 71p. Rept. no. edl-M892,
Contract DA-28-043-AMC-00379 (E)

Unclassified report

Descriptors: (*Antennas, Camouflage), (*Camouflage, Antennas), (*Propagation, Antennas), Roofs, Portable, Shelters, Omnidirectibnal antennas, Dipole antennas, Antennas arrays, Parabolic antennas, Spiral antennas, Yagi antennas, Antenna configurations, Log periodic antennas, Horn antennas, Antenna radiation patterns, Antenna lobes, Antenna feeds, Gain, Direction finding, Antenna aperature, Waveguides, Microwave equipment, Frequency, Tracking

The report involves an initial effort to describe antenna system requirements for covert applications. The study shows that the antenna problem may be categorized according to the antenna's operating frequency, its physical location, and the particular electrical function it is to perform. The frequency range considered is from VHF through K band. Some specific antenna problems that arise and some solutions to these problems are presented. Although covert antennas may find use in the HF band, they are not treated in this report. A preliminary study of the propagation aspects that arise in connection with the covert activities are iscussed. In addition, investigation results of some new antenna techniques that are applicable for covert application are presented. The system treatment, propagation aspects, and antenna techniques considered in this report can serve as the bases for further covert antenna studies. (Author)

AD-629 155 Fld. 9/5, 20/14
CFSTI Prices: HC $6.00 MF $1.50
STANFORD RESEARCH INST MENLO PARK CALIF
LITERATURE SURVEY PERTAINING TO ELECTRICALLY SMALL ANTENNAS, PROPAGATION THROUGH VEGETATION, AND RELATED TOPICS.
Special technical rept.,
by John Taylor, Kenneth A. Posey, and George H. Hagan. Jan 66, 287p. Rept. no. STR-17,
Contract DA-36-AMC-00040 (E),ARPA Order-371 Proj. SRI-4240,

Unclassified report

Descriptors: (*Antennas, Bibliographics), (*Propagation, Terrain), Abstracts, Impedance matching, Electrical impedance, Antenna radiation patterns, Jungles, Mountains, Electromagnetic waves, Propagation, Plants (Botony), Circuits, Ground (Electrical), State-of-the-art reviews, High frequency

Bibliographical references, with abstracts wherever possible, are given for reports, papers, and books pertaining to the theory and practical use of electrically small antennas in a variety of environments and locations. References are grouped by content into categories: electrically small antennas; matching circuits and antenna impedances; ground constants; ground proximity loss; burned antennas; propagation over lossy ground; propagation through stratified media; propagation through vegetation; patterns and directivity of antennas over lossy ground; books, bibliographies, and surveys; and general, including historical reviews. A list of authors and an index of cross references between categories are provided. The dates of the references extend from pre-World War II to early 1966, with the preponderant emphasis on the period 1960-1966. (Author)

AD-629 306 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
CONSTANT-BEAMWIDTH ANTENNA DEVELOPMENT.
Technical memo.
19 Nov 65, 56p. Rept. no. EDL-M891,
Contract DA-28-043-AMC-00379 (E),

Unclassified report

Descriptors: (*Antennas, Design), Reflectors, Antenna feeds, Antenna radiation patterns, Theory, Gain, Search radar, Bandwidth, Tracking, Lens antennas, Power, Antenna apertures

The report describes an antenna which can be used as a surveillance antenna over frequency bandwidths as large as 12:1, and, through mechanical motion of the feed portion, as an automatic tracking antenna over 10:1 bandwidths. The antenna produces a pattern whose half-power beamwidth is relatively constant over a large portion of the total frequency band of operation. Theoretical formulations are presented for an antenna of this type, together with some measured data taken from previous antennas built by EDL employing the constantbeamwidth principle. Finally, the results of a computer program are described which was aimed at determining the secondary radiation pattern of such an antenna according to several design variables. (Author)

AD-629 339 Fld. 9/5, 9/1
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y RESEARCH DEPT
DISTRIBUTION THEORY AS THE BASIS OF GENERALIZED PASSIVE-NETWORK ANALYSIS.
Revised ed.,
by M. R. Wohlers, and E. J. Beltrami. 19 Nov 64, 9p. Contract AF 49 (638)-1512, AFOSR 65-2094

Unclassified report

Revision of Manuscript submitted 1 May 64.

Availability: Published in IEEE Transactions on circuit Theory vCT12 n2 p164-70 Jun 1965. Copies to DDC users only.

Descriptors: (*Distribution theory, Electrical networks), (*Electrical networks, Distribution theory), Distribution functions, Boundary value problems, Circuits

The properties of linear time-invariant passive systems are described in the context of generalized function (distribution) theory. The postulatory description of these systems is phrased in both the scattering or wave formulation, and the impedance or voltage-current basis. One conclusion of the paper is that a specific definition of passivity (attributed to G. Raisbeck) leads to a complete description of the system only when the postulate of causality is separately invoked; i.e., this definition of passivity does not imply causality and it is therefore a more fundamental assumption. Another conclusion is that the two seemingly different sets of postulates (scattering and impedance) are in many instances identical; the differences arise solely in the assumptions made concerning the domains of the two operators. Distribution theory is also used in an essential way to obtain new existence theorems, for both formulations, which are stated entirely on the real-frequency axis. The language used is deliberately that of generalized function theory, so that the class of admissible systems and the inputs to these systems are broadened. In particular, the results can be applied directly to systems which are described in terms of elementary functions. (Author)

AD-629 353 Fld. 9/5
CFSTI Prices: HC $1.00 MF $0.50
NAVAL ORDNANCE LAB CORONA CALIF
BROAD-BAND VLF TRANSMITTING TERMINATED DIPOLE,
by Edwin W. Seeley. 7 Feb 66, 22p. Rept. no. NOLC-638,

Unclassified report

Descriptors: (*Dipole antennas, Very low frequency), Broadband, Ionosphere, Scientific research, Theory, Experimental data, Mathematical analysis, Design, Electrical impedance, Bandwidth, Attenuation, Antenna radiation patterns, Electromagnetic waves, Propagation

The need is cited for an efficient, easily constructed broad-band VLF transmitting antenna for ionospheric and other research. A multiconductor horizontal dipole is investigated experimentally and theoretically. The radiated E-field equations are derived for the terminated dipole, and field-strength measurements made out to 1400 km confirm the equations. Two such dipoles (a 5 -conductor over soil of 16 mmho/m conductivity, and another with 10 conductors over a lava bed of 0.8 mmho/m conductivity) were constructed in the California desert. Measurements made yielded design data: impedance measurements to obtain propagation constants, bandwidth, attenuation per unit length, and mutual and characteristic impedances. Methods of improving efficiency of the horizontal dipole are discussed. (Author)

AD-629 389 Fld. 9/5
CFSTI Prices: HC $1.00 MF $0.50
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
INPUT OPERATIONAL AMPLIFIER.
Interim rept.,
by P. Heimdal. May 65, 20p. Rept. no. U-173,

Unclassified report

Descriptors: (*Amplifiers, Design), Differentiating circuits, Semiconductor devices, Printed circuits, Norway

An input operational amplifier, used as the source for a sample and hold circuit is described. The amplifier operates in the frequency band 0 to 1000 c/s. The output voltage range is 0V to +6V. The amplifier has one -6V reference input and three signal inputs, each centered around 0 volts. The gains from signal inputs 1, 2 and 3 to the output are -1, -3 and -10 times, respectively. Overall accuracy is 8 plus or minus 0.5 bits, with 8 bits corresponding to 6 volts. (Author)

AD-629 410 Fld. 9/5
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
REFLECTOR SURFACE DEVIATIONS IN LARGE PARABOLIC ANTENNAS.
Revised ed.,
by L. J. Anderson, and L. H. Groth. 26 Oct 62, 6p. Contract DA-30-069-ORD-2554 ,ARPA Order-53-62

Unclassified report

Revision of manuscript submitted 16 Jul 62.

Availability: Published in IEEE Transactions on Antennas and Propagation vAP-11 n2 p148-52 Mar 1963. Copies to DDC users only.

Descriptors: (*Parabolic antennas, Reflectors), (*Reflectors, Surfaces), Antenna feeds, Focusing, Geometry, Measurement, Gain, Degradation, Deformation, Parabolic bodies, Wind

One of the important factors affecting the efficiency of parabolic reflector antennas is the degree to which the surface of the reflector deviates from the true parabolic shape. For a given reflector surface it is also important to locate the focal point of the best-fit paraboloid relative to the existing feed support structure. A simple method is presented for making these measurements, and results are given for a particular 60-ft diameter reflector. Static measurements were made with the antenna axis pointed vertically upwards, and changes were also measured as a function of elevation angle and wind. When the surface errors have a Gaussian distribution relative to the focal point, simple theory indicates that the received power relative to that from a perfect reflecting surface is P/P sub 0=exp-(2 pi sigma/lambda)squared where sigma is the standard deviation of the surface errors and lambda is the operating wavelength. (Author)

AD-629 442 Fld. 9/5, 9/3
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SYNTHESIS OF FLAT-APERTURE ANTENNAS,
by E. G. Zelkin. 1 Feb 66, 10p. Rept. no. FTD-TT-65-1601, TT 66-60729

Unclassified report

Unedited rough draft trans. of mono. Moskva. Vsesoyuznyi Simpozium po Difraktsii, v3, 24-30 Sep, Tbilisi, 1964 n3 p137-41.

Descriptors: (*Antennas, Synthesis), Antenna apertures, Electromagnetic lenses, Mathematical analysis, USSR

AD-629 468 Fld. 9/5, 17/9
ARECIBO IONOSPHERIC OBSERVATORY PUERTO RICO
ARECIBO RADAR-RADIO TELESCOPE-DESIGN AND CONSTRUCTION,
by Thomas C. Kavanagh, and David H. H. Tung. 1965, 31p. Contract AF 49 (638)-1156, AFOSR 66-0399

Unclassified report

Availability: Published in Journal of the Construction Division, Proceedings of the American Society of Civil Engineers v91 nCO1 p71-98 May 1965. Copies to DDC users only.

Descriptors: (*Radio telescopes, Puerto Rico), (*Radar antennas, Puerto Rico), Antennas, Spheres, Reflectors, Design, Site selection, Construction, Astronomy, Atmospheric sounding

The design and construction of the radar-radio telescope at the Arecibo, Puerto Rico Ionospheric Observatory is described. The fixed-dish spherical reflector has an 870-ft radius and a 1,000-ft diameter. The movable feed, capable of scanning the sky to 20 degrees from the zenith, is independently suspended from three reinforced concrete towers using steel cables. Rigid specifications and a low budget required the application of many advanced structural, mechanical, and electronic concepts. The site selection, construction of the towers using slip frames, and erection and suspension of the movable feed are described in detail. (Author)

AD-629 543 Fld. 9/5
CFSTI Prices: HC $4.60 MF $0.50
SYLVANIA ELECTRONIC SYSTEMS-CENTRAL WILLIAMSVILLE N Y
ELECTRONICALLY STEERABLE ARRAY.
Quarterly rept. no. 3,
by T. R. Schiller, and W. S. Heath. Jan 66, 44p.
Contract AF 30 (602)-3041, Proj. AF-4506
Task 450604,
RADC TR-65-361

Unclassified report

See also AD-425 478.

Descriptors: (*Antenna arrays, Electronic scanners), Millimeter waves, Scanning, Antenna aperatures, Antenna feeds, Phase shifters, Ferromagnetic materials

The report describes the effort expended during the third quarter on the Engineering Change "A" portion of the Electronically Steerable Array Program to design and build a high gain, electronically steerable, millimeter antenna system. During this period the block of ferrite used in the scanner was tapered so that the output end was larger than the input. This resulted in greater scan capability and lower sidelobes. In addition, the design of the final antenna model was finalized and construction of the antenna started. (Author)

AD-629 546 Fld. 9/5
CFSTI Prices: HC $4.00 MF $0.75
SPERRY GYROSCOPE CO GREAT NECK N Y
TRANSVERSE ANTENNA FEED STUDY.
Final rept., 15 Jan 63-30 Sep 65,
by P. C. Loux, L. I. Smilen, and R. W. Martin. Jan 66, 115p. Rept. no. RD-5297-0718,
Contract AF 19 (628)-2759, Proj. AF-4600,
Task 460007,
AFCRL 66-79

Unclassified report

Descriptors: (*Antenna feeds, Antenna radiation patterns), Reflectors, Microwaves, Electromagnetic fields, Antenna apertures, Wave transmission, Phase control devices

The report summarizes the results of an experimental and theoretical investigation of the transverse focal region fields of a Cassegrain antenna. The ultimate goal is the development of distributed feed systems capable of improving the transmission and reception properties of reflector antennas. A prototype Cassegrain microwave antenna, which was sufficiently flexible to provide a variety of focal field distributions and a feed system capable of bing conjugate matched, was constructed and tested. Focal region fields due to

scanned incoming plane waves and also reflector distorted on-axis waves were both measured and conjugate matched. As evidenced by the Fraunhofer patterns, aberrations caused by beam scan or reflector distortion were significantly reduced. Geometrical and physical optics methods were used to calculate the fields on the subreflector and the latter used to obtain the fields in the system focal region. The experimental and analytical results are presented in a series of curves. A general formulation of the feed network was made and a method for its realization indicated. (Author)

AD-629 578 Fld. 9/5
CFSTI Prices: HC $6.00 MF $1.25
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
SEMICONDUCTOR INTEGRATED OSCILLATORS.
Research rept.,
by G. D. Hachtel. 17 Aug 65, 216p. Rept. no. ERL-65-32,
Contract AF 33 (615)-1045 ,AF-AFOSR-139-64

Unclassified report

Descriptors: (*Oscillators, Semiconductor devices), (*Integrated circuits, Oscillators), Theory, Stability

The realization of oscillation in monolithic semiconductor integrated circuits was considered. A procedure was developed for the synthesis of integrable, near-harmonic, oscillators from known, integrable, bistable circuits. By the insertion of resistors, capacitors, and batteries, the procedure converts the integrable bistable circuits into 'inductor-less' oscillators. Experimental integrated realizations of oscillators synthesized were fabricated.

AD-629 596 Fld. 9/5, 9/3, 20/12, 11/6
CFSTI Prices: HC $2.60 MF $0.50
RADIO CORP OF AMERICA CAMDEN N J DEFENSE ELECTRONIC PRODUCTS
MICROELECTRONIC SOLID-STATE DISPLAY ASSEMBLY.
Interim development rept. no. 3, 1 Dec 65-1 Mar 66.
1 Mar 66, 30p. Contract NObsr-93320, Proj. SR-008-0303, Task 9371,

Unclassified report

See also AD-625 370.

Descriptors: (*Microminiaturization (Electronics), Display systems), (*Printed circuits, Intermetallic compounds), (*Cadmium alloys, Selenium alloys), (*Intermetallic compounds, Printed circuits), Solid state physics, Molecular electronics, Electroluminescence, Manufacturing methods, Cadmium compounds, Selenides, Sandwich construction, Test equipment (Electronics), Hysteresis

Configuration and fabrication studies on CdSe-El display panels were carried out. These studies were concerned with the removal of large particles from CdSe powder, temperature tests on one of the panels, increase in binder content, use of different sizes and types of wire electrodes, tape-separated CdSe, two levels of triggering, and the effect of light on the cutoff voltage. Post-fire treatments involving atmosphere, temperature, humidity and light established that the proper treatment can improve the operation of the CdSe. It has been found that some degree of isolation between the elements of the CdSe-El panel is required to eliminate crosstalk. (Author)

AD-629 620 Fld. 9/5
CFSTI Prices: HC $1.60 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
THE QUASI-STATIC FIELDS OF DIPOLE ANTENNAS. PART III.
Research rept.,
by Peter R. Bannister, and William C. Hart. 23 Feb 66, 19p. Rept. no. USL-720,
Proj. SF-106-01-02-7077 ,USL-1-901-00-00

Unclassified report

See also AD-626 321.

Descriptors: (*Antenna radiation patterns, Dipole antennas), (*Dipole antennas, Field theory), Electric fields, Magnetic fields

The electric and magnetic field components produced by vertical and horizontal magnetic dipoles are presented for the quasi-static range of (free space propagation constant x rho) <<1< (earth propagation constant x rho) with (free space propagation constant x z) <<1, h = 0, and z > or = 0. The special case of burying the transmitting dipole (h < or = 0) is also considered. This range has been considered by many writers, but with the restriction that rho >> z. In this report, the authors evaluate the previously underived (to the authors' knowledge) components that are valid for any height z (neglecting ionospheric effects). (Author)

AD-629 686 Fld. 9/5
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
ON THE TERMINAL DESCRIPTION OF NONLINEAR NETWORKS,
by R. W. Newcomb. 2 Jun 65, 3p. Contract AF-AFOSR-337-63,
AFOSR 65-2788

Unclassified report

Availability: Published in Proceedings of the IEEE, v53 n8 p1149-50 Aug 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Nonlinear systems), (*Circuits, Theory), Time, Electric currents, Voltage

A general description is introduced as a means for expressing the terminal constraints on port variables for nonlinear networks.

AD-629 743 Fld. 9/5, 9/3, 14/2
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
FREQUENCY SOURCE THAT KEEPS TIME EVEN IF MAIN POWER SOURCE FALTERS,
by B. E. Bourne. 1965, 3p.
NRC 8858

Unclassified report

Availability: Published in Canadian Electronics Engineering Feb 1966. Copies to DDC users only.

Descriptors: (*Power supplies, Timing circuits), (*Clocks, Power supplies), Frequency dividers, Amplifiers, Transistors, Oscillators, Batteries + components, Switching circuits

A stable 60-Hz source had been used for several years to drive clocks and generate time marks for meteor radar equipment. Even a momentary power failure would cause the clocks to stop and time reference would be lost. This has now been prevented by the provision of a completely transistorized frequency divider and amplifier system powered from a 12-volt battery continuously charged by the AC line. A 50-kHz transistor oscillator takes over as a signal source when the crystal oscillator is out of action.

AD-628 921 See Fld. 9/3

AD-628 980 See Fld. 17/2

AD-629 025 See Fld. 20/7

AD-629 060 See Fld. 12/1

AD-629 108 See Fld. 20/14

AD-629 140 See Fld. 14/3

AD-629 193 See Fld. 14/2

AD-629 325 See Fld. 20/14

AD-629 352 See Fld. 17/2

AD-629 363 See Fld. 17/9

AD-629 403 See Fld. 17/2

AD-629 454 See Fld. 17/9

AD-629 513 See Fld. 14/5

AD-629 537 See Fld. 20/9

AD-629 571 See Fld. 9/1

AD-629 645 See Fld. 20/14

AD-629 720 See Fld. 11/9

Field 10-ENERGY CONVERSION (NON-PROPULSIVE)

10/1. CONVERSION TECHNIQUES

AD-629 241 See Fld. 10/2

10/2. POWER SOURCES

AD-629 006 Fld. 10/2, 17/7, 13/10
CFSTI Prices: HC $1.00 MF $0.50
WESTINGHOUSE ELECTRIC CORP LIMA OHIO AEROSPACE ELECTRICAL DIV
100 WATT THERMOELECTRIC POWER SYSTEM FOR BUOY APPLICATIONS.
Monthly progress rept. no. 20, 11 Jan-11 Feb 66,
by Dale A. Naumer. 11 Feb 66, 5p. Contract N600 (61533)61992,

Unclassified report

See also AD-626 858.

Descriptors: (*Thermoelectricity, Buoys), (*Buoys, Power Supplies), Electric power production, Generators, Marker lights, Heat sinks, Performance (Engineering), Temperature control, Life expectancy

AD-629 220 Fld. 10/2
CFSTI Prices: HC $5.60 MF $0.50
MONSANTO RESEARCH CORP EVERETT MASS BOSTON LAB
60-WATT HYDRAZINE-AIR FUEL CELL SYSTEM.
Rept. no. 1, 1 Jul-1 Nov 65 (Interim),
by Peter L. Terry. Feb 66, 51p. Rept. no. mrb-402811,
Contract DA-28-043-AMC-01460 (E), Proj. DA-1C6-22001-A-053, Task 1C6-22001-A-053-04-12,
ECOM 01460-1

Unclassified report

Descriptors: (*Hydrazine, Fuel cells), (*Fuel cells, Hydrazine), Batteries + components, Air, Design, Temperature control, Fuel systems, Voltage dividers, Cooling, Heaters, Control systems, Wiring diagrams, Electrodes, Packaging

This report covers the design of the 60-watt hydrazine-air fuel cell system as presented in our Design Plan. Prior to preparation of the Design Plan, a systems analysis of the basic electrochemical system was made. From the results of this analysis, the operating parameters of the support equipment were defined and an initial selection of components made. System components defined were: the cell stack, electrolyte tank, hydrazine feed system, cooling and chemical air blowers, voltage regulator, and thermal control system. A package design was then made for these components and the final detail design completed. (Author)

AD-629 241 Fld. 10/2, 10/1
CFSTI Prices: HC $3.00 MF $0.75
WISCONSIN UNIV MADISON SOLAR ENERGY LAB
PHOTOVOLTAIC POWER SYSTEMS USING HIGH SOLAR ENERGY FLUXES.
Final rept., 1 Mar 64-30 Nov 65,
by P. Schoffer, and W. Beckman. 30 Dec 65, 73p.
Contract DA-28-043-AMC-00005 (E), Proj. DA-1C6-22001-A-053, Task 01,
Unclassified report

See also AD-458 879.

Descriptors: (*Solar cells, Energy conversion), (*Energy conversion, Solar cells), (*Power supplies, Solar cells), Electric power production, Silicon, Reflectors, Cooling + ventilating equipment, Heat sinks, Performance (Engineering), Effectiveness, Heat exchangers

Experimental data is presented on the operation of a high solar flux power system. Using 18 one by two cm cells with 20 gridlines/cm and with a concentrated solar flux of about 25 W/sq cm, the system produced 40 watts of electrical power. Approximately 5 of the 40 watts are necessary for the cooling system pump motor. The expected net output of 50 watts was not obtained due to low cell efficiencies and nonuniform flux distribution. Probable reasons for the low cell efficiencies are discussed and a method for obtaining a more uniform flux distribution is presented. Tests on the individual cooling system components are also presented. (Author)

AD-629 447 Fld. 10/2, 5/3
CFSTI Prices: HC $2.60 MF $0.50
RAND CORP SANTA MONICA CALIF
IS THE MARBLE CANYON PROJECT ECONOMICALLY JUSTIFIED,
by Alan P. Carlin, and William E. Hoehn. Feb 66, 26p. Rept. no. P-3302,
Unclassified report

Descriptors: (*Electric power production, Economics), Costs, Colorado, Feasibility studies

AD-629 476 Fld. 10/2, 9/3
CFSTI Prices: HC $2.00 MF $0.50
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
ELECTROMAGNETIC AND ELECTROSTATIC GENERATORS: ANNOTATED BIBLIOGRAPHY.
ATD work assignment no. 51,
by Jordan V. Randjelovic. 15 Nov 65, 33p. Rept. no. ATD-65-103,
TT 66-60736
Unclassified report

Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Electrostatic generators, Bibliographies), (*Generators, Bibliographies), (*Electromagnets, Generators), Electrical equipment, Electrical engineering, Energy conversion

This annotated bibliography was compiled from Soviet open sources published 1961-1965. The report reviews Soviet developments in electrostatic and electromagnetic generators. Information not directly related to the assigned subject has been included because of its broad implications for study in this field. The 133 entries are arranged chrono-logically within each of the following categories: electromagnetic generators (24 entries), electrostatic generators (7 entries), electric motors and machines (77 entries), and associated technology (25 entries). Arrangement within the chronological subsections is alphabetical by author. Other pertinent information included: synchronous generators, turbogenerator, inductor alternators, twin-generator with split poles, ultrasonic-frequency generator, unipolar generator, single-phase micromotors, synchronous motor, asynchronous motor, asymmetrical rotor, magnetic circuit, dc micromotors, circuit for the automatic control of synchronized induction motors, induction torque micromotors, electric step motor, contactless dc motor, hysteresis motor, contactless dc electric drive, motor-amplifier series, electric jet engines, direct conversion of thermal energy into electrical, pulse transformer with coaxial cable windings, and a magneto-textured alloy with constant and high permeability. (Author)

AD-629 562 Fld. 10/2, 9/3, 18/5
CFSTI Prices: HC $4.60 MF $0.50
GARRETT CORP LOS ANGELES CALIF AIRESEARCH MFG DIV
587 - KVA 24,000-RPM ALTERNATOR. PART NO. 546136-1-1.
Final rept.,
by F. B. McCarty, and S. Tarhov. 28 Dec 65, 47p. Rept. no. F-4341-Rev-1,
Contract DA-44-009-eng-5251,
Unclassified report

Descriptors: (*Generators, Alternating current), (*Nuclear reactors, Generators), Design, Performance (Engineering), Power supplies, Operation, Electric power production

The report includes the description of the alternator, installation and operation instructions, and development test data needed to ascertain the capability of the machine. The testing conducted was undertaken to verify the attainment of the design objectives for this machine. Operation of the alternator at full load conditions was not conducted because available laboratory equipment was not adequate for such a high power level.

AD-629 635 **See Fld. 1/3**

AD-629 720 **See Fld. 11/9**

10/3. ENERGY STORAGE

AD-628 961 Fld. 10/3
CFSTI Prices: HC $8.60 MF $0.75
ELECTRIC STORAGE BATTERY CO YARDLEY PA
HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE).
Quarterly rept. no. 1, 15 Jun-15 Sep 65,
by D. P. Boden, H. R. Buhner, and V. J. Spera. Oct 65, 82p. Contract DA-28-043-AMC-01394 (E),
ECOM 01394-1
Unclassified report

Descriptors: (*Batteries + components, Electrolytes), (*Electrolytes, Organic materials), Electrical conductance, Lithium compounds, Perchlorates, Propenes, Carbonates, Corrosion, Solubility, Copper compounds, Fluorides, Cathodes (Electrolytic cell), Material forming, Anodes (Electrolytic cell), Lithium, Thermodynamics, Reaction kinetics, Electrochemistry, Deposition

The study of high energy density systems included conductance measurements of various non-aqueous electrolytes; corrosion and solubility studies of electrode materials in electrolytes; preparation of a reversible lithium reference electrode; fabrication and evaluation of lithium anodes and CuF2, CoF3 and CrF3 cathodes; thermodynamic studies of the lithium-cupric fluoride cell; and kinetic studies of the cupric fluoride discharge reaction.

AD-628 999 Fld. 10/3
CFSTI Prices: HC $2.60 MF $0.50
NAVAL ORDNANCE LAB CORONA CALIF
CHEMOELECTRIC ENERGY CONVERSION FOR NONAQUEOUS RESERVE BATTERIES.
Quarterly rept. no. 10, Oct-Dec 65,
by Richard E. Panzer, and Gerald E. McWilliams.
1 Feb 66, 24p.
NAVWEPS 8848
Unclassified report

See also AD-624 811.

Descriptors: (*Guided missile batteries, Electrochemistry), (*Wet cells, Electrochemistry), (*Storage batteries, Electrochemistry), Batteries + components, Electrodes, Nitrides, Ammonia, Lithium, Battery separators, Electrolytes, Concentration (Chemistry), Probes (Electromagnetic), Thermistors, Canides, Amides, Electrical discharges, Instrumentation, Calorimeters

Investigation of metal/metal nitride systems was continued in the search for satisfactory reference electrodes in liquid ammonia; lithium-electron electrodes were studied; new separator materials were used for a diffusion barrier between the reference electrode chamber and the main test-cell cavity; apparatus and procedures were developed to control electrolyte concentration in conductance measurements at pressures to 25 atm; a thermistor probe was developed for temperature measurements with an accuracy of approximately 0.05C in the immediate vicinity of the experimental electrode; and cyanamide derivatives were prepared for use as neutral and acidic electrolytes in voltaic cells. A calorimeter was modified for measuring heat output of a liquid ammonia battery during discharge; a simulus test fixture was designed and built for controlling critical assembly parameters and measuring dynamic discharge conditions; and battery test instrumentation was improved. (Author)

AD-629 419 Fld. 10/3
CFSTI Prices: HC $4.60 MF $0.50
EAGLE-PICHER CO JOPLIN MO COUPLES DEPT
ADVANCED DEVELOPMENT MODELS OF VENTED NICKEL-CADMIUM BATTERIES.
Acceptance test rept.,
by H. H. LaFollette. 1 Dec 65, 49p. Contract DA-28-043-AMC-00065 (E), Proj. DA-1C6-22001-A-053, Task 1C6-22001-A-053-02,
Unclassified report

Descriptors: (*Alkaline cells, Tests), Performance (Engineering), Nickel, Cadmium, Tables

Sixteen (16) batteries each of BB-435/U, BB-437/U, BB-438/U and BB-439/U were subjected to acceptance tests. The lot for each battery type was deemed acceptable based on performance during these tests. (Author)

AD-629 501 Fld. 10/3
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J INST FOR EXPLORATORY RESEARCH
THIN-FILM RECHARGEABLE SOLID-ELECTROLYTE BATTERIES,
Revised ed.,
by J. N. Mrgudich, P. J. Bramhall, and J. J. Finnegan. 10 Sep 65, 8p.
Unclassified report

Revision of manuscript submitted 29 Apr 65.

Availability: Published in IEEE Transactions on Aerospace and Electronic Systems vAES-1 n1 p290-6 Dec 1965. Copies to DDC users only.

Descriptors: (*Dry cells, Electrolytes), (*Electrolytes, Reclamation), Solids, Films, Miniature electrical equipment, Life expectancy, Oxidation-reduction reactions, Silver compounds, Iodides, Platinum, Silver

A brief description of the basic oxidation-reduction processes taking place in the dry cell is used to show that substitution of solid electrolytes for conventional liquid electrolytes can enhance battery miniaturization potential without sacrifice of

shelf life. Previously developed solid-electrolyte batteries, however, exhibited prohibitively high internal resistance. Solid-electrolyte batteries of the type Ag-AgI-Pt, working on concentrationcell rather than conventional oxidation-reduction principles, have significantly lower internal resistance. Such cells can be made quite small (possibly down to 0.002 cc per cell), have apparently excellent shelf life, and are operable at 100C. Moreover, they show a recharge capability. In addition, they appear amenable to development effort leading to a thin-film, printable battery with application possibilities. (Author)

AD-629 720 See Fld. 11/9

Field 11-MATERIALS

11/1. ADHESIVES AND SEALS

AD-629 720 See Fld. 11/9

11/2. CERAMICS, REFRACTORIES, AND GLASSES

AD-629 228 Fld. 11/2
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CERTAIN PROPERTIES OF CALCIUM-OXIDE REFRACTORIES,
by E. S. Lukin, and G. A. Serova. 20 Jan 66, 14p. Rept. no. ftd-TT-65-1396, TT 66-60699

Unclassified report

Unedited rough draft trans. of Teplofizika Vysokikh Temperatur (USSR) v2 n5 p736-41 1964.

Descriptors: (*Refractory materials, Stability), (*Calcium compounds, Refractory materials), (*Oxides, Refractory materials), Alkali metals, Vapors, Sintering, Particles, Corrosive gases, Lithium, USSR, Chemical properties

The report deals with the obtainment of CaO refractories, dense (sintered) and granular constructions for use at high temperatures in alkaline-metal vapor. Study was made of the properties of refractories at high temperatures and of their stability under the action of alkaline-metal vapors.

AD-629 307 Fld. 11/2, 13/8
CFSTI Prices: MF $1.00
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
SYSTEMS ENGINEERING IN CERAMICS.
1 May 65, 150p. Rept. no. miscellaneous pub-267,

Unclassified report

Proceedings of an American Ceramic Society Symposium, Chicago, Ill., April 19, 1964.

Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $2.00

Descriptors: (*Ceramic materials, Systems engineering), (*Systems engineering, Symposia), Industrial production, Computers, Statistical analysis, Manufacturing methods

Contents: Systems Engineering and Modern Engineering Design; Basic Concepts of Systems Engineering; Process Control in the Ceramic Industry; Application of Computers in Design and Control of Systems; Statistical Methods in Systems Design; Systems of Interest to Ceramic Engineers.

AD-629 490 Fld. 11/2, 20/2
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
DEFECT STRUCTURE AND ELECTRICAL PROPERTIES OF SOME REFRACTORY METAL OXIDES,
by Norman M. Tallan, Robert W. Vest, and Henry C. Graham. 1963, 39p. Rept. no. arl-65-247, Proj. AF-7021, Task 702100,

Unclassified report

Prepared in cooperation with Systems Research Labs., Inc., Dayton, Ohio.

Availability: Published in Material Science Research v2 p33-67 1965. Copies to DDC users only.

Descriptors: (*Refractory metals, Oxides), (*Thermodynamics, Refractory materials), (*Ceramic materials, Crystal lattice defects), Electrical properties, Thermoelectricity, Zirconium compounds, Dioxides, Impurities, Doping, Calcium, Weight, Transport properties, Band theory of solids

A brief description of the equilibrium thermodynamic approach to the characterization of defect concentrations in refractory metal oxides as a function of temperature; oxygen partial pressure, and impurity content is given. Techniques for the determination of ionic and electronic transport numbers by a blocking electrode polarization measurement and for the measurement of conductivity, thermoelectric power, and weight change are reviewed. The application of this approach and these measurements to the determination of the extent of deviation from stoichiometry, the nature and ionization state of the defects which predominate, and the mechanism of charge transport are illustrated by detailed consideration of several specific examples. Measurements on calcium-stabilized zirconia are cited as an example of an oxide in which the defect structure and conductivity are controlled by aliovalent foreign ions. This material is intrinsically a pure oxygen-ion conductor down to very low temperatures, but some electronic conductivity may be observed in the presence of certain impurities. (Author)

AD-629 570 Fld. 11/2, 20/13
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE THERMODYNAMICS OF THE ZIRCONIA/ZIRCONIUM-OXYGEN VAPOR SYSTEM,
by E. J. Krieger. Feb 66, 34p. Rept. no. RM-4907-PR, Contract AF 49 (638)-1700,

Unclassified report

See also AD-468 229.

Descriptors: (*Zirconium compounds, Thermodynamics), (*Ablation, Theory), Zirconium, Oxygen, Oxides, Vapors, Space environmental conditions, High-pressure research, High-temperature research, Reentry vehicles, Enthalpy, Entropy, Pressure, Temperature, Molecular weight, Graphics, Tables, Gases, Phase studies, Chemical equilibrium, Density

The study reports the thermodynamic investigation of zirconia, Zr02, over a range of temperatures up to 6000 K and pressures up to 1000 atmospheres. Two sets of equilibrium composition equations are usedone representing a pure gas phase, the other a heterogeneous system of gas and condensed (i.e., solid or liquid) zirconia. The gas phase of the heterogeneous chemical system, like the homogeneous gas phase, comprises five gaseous zirconium-oxygen species. The results of the computational program are presented in both tabular and graphic form. The latter is a conventional Mollier diagram in which specific enthalpy is plotted against specific entropy, with cross plots of temperature, pressure, and molecular weight or moles of condensed irconia. (Author)

AD-629 699 Fld. 11/2, 20/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB
EXSOLUTION OF BETA-GA203 CRYSTALLINF SOLUTIONS IN THE SYSTEM MGA1204-GA2O3,
by Gerald Katz, and Rustum Roy. 20 Nov 64, 5p. Contract AF-AFOSR-208-63, Proj. AF-9761, Task 976102, AFOSR 66-0232

Unclassified report

Presented at Annual Meeting the American Ceramic Society (6th), Chicago, Ill. 21 Apr 1964.

Availability: Published in J. Am. Ceram. Soc. v48 n9 p450-2 1965. Copies to DDC users only.

Descriptors: (*Spinels, Phase studies), (*Ceramic materials, Phase studies), (*Oxides, Chemical precipitation), Gallium compounds, Magnesium compounds, Aluminates, Solutions, Crystals, Temperature

The subsolidus phase equillibrium diagram for the pseudobinary join MgAl2O4-Ga2O3 was determined. The shape of the exsolution boundary was obtained by heat-treating samples preequilibrated at 1600C. Crystalline solubility of Ga2O3 in MgAl2O4 decreased from 73 mole % at 1600Cto 55 mole % at 1200C. The crystalline solution was formed by the replacement of Mg (2+) ions by Ga (3+) ions to produce a cation defect spinel. The phase precipitated was the monoclinic beta-Ga2O3 (=theta-Al2O3 structure). Changes in the ratios of relative X-ray diffraction intensities indicated that the crystalline solutions also disorder with temperature. (Author)

AD-629 013 See Fld. 11/7

AD-629 106 See Fld. 11/6

AD-629 481 See Fld. 20/2

AD-629 482 See Fld. 20/2

AD-629 510 See Fld. 13/10

AD-629 720 See Fld. 11/9

11/3. COATINGS, COLORANTS, AND FINISHES

AD-629 731 Fld. 11/3, 13/10
CFSTI Prices: HC $1.10 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
PLASTICS-BASED ANTICORROSIVE COATINGS NO. 28. SYNTHETIC COATINGS FOR SHIPS' HULLS.
1966, 7p. Rept. no. translation-2108, TT 66-60746

Unclassified report

Sinteticheskie Materialy v Sudostroenie i Sudoremonte, trans. of mono. Morskoi Transport, Moscow, 1962 p150-8.

Descriptors: (*Plastic coatings, Ship hulls), (*Ship hulls, Corrosion inhibition), USSR, Plastic paints, Paint primers, Antifouling coatings

AD-628 992 See Fld. 13/8

AD-629 106 See Fld. 11/6

AD-629 370 See Fld. 11/5

AD-629 720 See Fld. 11/9

11/4. COMPOSITE MATERIALS

AD-629 413 Fld. 11/4, 11/6, 13/9, 13/8
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
POWDER METAL MATERIALS FOR MANUFACTURING LARGE-SCALE PARTS IN MACHINE-BUILDING AND CONSTRUCTION,

by A. P. Motulevich. 20 Jan 66, 5p. Rept. no. FTD-TT-65-1390, TT 66-60719

Unclassified report

Unedited rough draft trans. of Patent (USSR) 161 125, appl. 841667/22-2, 11 Jun 63.

Descriptors: (*Structural parts, Composite materials), (*Powder metals, Composite materials), Machine tool industry, Mixtures, Powder metals, Ceramic materals, Manufacturing methods, USSR

The proposed powder metal materials consist of metals (e.g., steel, cast iron, aluminum, titanium) and a ceramic component (basalt, granite, spinel, corundum), which is introduced into the metal in the process of its fusion and has a heat resistance not lower than the temperature of fusion of the given metal. The application of such materials for manufacturing large-scale parts in machine-building and construction permits attaining a significant economy of the metal while preserving its compressive strength, heat resistance and resistance to corrosion. The parts can be manufactured by the known technological methods of casting, machining and welding. (Author)

AD-629 372 See Fld. 20/11

AD-629 674 See Fld. 11/8

11/5. FIBERS AND TEXTILES

AD-629 370 Fld. 11/5, 11/3
CFSTI Prices: HC $3.00 MF $0.50
NARMCO RESEARCH AND DEVELOPMENT DIV WHITTAKER CORP SAN DIEGO CALIF
THE EFFECTS OF MOISTURE ON THE STRENGTH OF GLASS FIBERS: A LITERATURE REVIEW,
by W. H. Otto. Jun 65, 51p. Contract Nonr-4522 (00) (X),

Unclassified report

Descriptors: (*Glass textiles, Moisture), Strength, Degradation, State-of-the-art reviews, Glass, Coating, Effectiveness, Theory, Mechanical properties, Fatigue (Mechanics), Failure (Mechanics), Yield paint, Stresses

A review of literature pertaining to the effects of moisture on the strength of glass fibers is presented in three (3) sections. The research on massive glass has been abstracted to provide background and general knowledge of the moisture effect. The limited information on uncoated glass fibers verifies at very high stresses the predictions based on massive glass studies and further elucidates the degradation mechanisms associated with environmental moisture. The literature on coated fibers discloses the minimal technical advances which have been made to retain the very high intrinsic strength of the fiber, particularly in protection from the strength-degrading effects of moisture. (Author)

AD-629 603 Fld. 11/5
CFSTI Prices: HC $3.00 MF $0.75
CLOTHING AND ORGANIC MATERIALS DIV ARMY NATICK LABS MASS
MASS, PERMEABILITY, AND THICKNESS CHANGES IN ABRADED FABRICS.
Technical rept.,
by Louis I. Weiner, and Fritz F. Kobayashi. Oct 65, 75p. Rept. no. TS-136,
Proj. DA-1C024401A329,

Unclassified report

Prepared in cooperation with Lowell Technological Inst., Mass.

Descriptors: (*Textiles, Abrasive resistance), Abrasives, Cotton, Permeability, Thickness, Weight, Measurement, Clothing

The report presents the changes that take place during the abrasion of textile fabrics. Changes in permeability are shown to be influenced by the extent to which the abraded fabric will retain fiber debris during the course of the abrasion. While the permeability of a cotton oxford fabric decreases continuously and significantly up to the point of hole formation, the permeability of a sateen fabric increases during abrasion, an effect which is normally expected as a result of breakdown in the yarn structure. The extent to which the fiber debris is retained by the fabric is a function of the rate of loss of mass. Thickness decreases are a function more of the type of abrader than of the type of fabric. Changes in permeability as well as in thickness are not simple functions of the degree of abrasion of all fabric types; they must be viewed in terms of the response of specific fabrics to specific types of abrasive action. (Author)

11/6. METALLURGY AND METALLOGRAPHY

AD-628 957 Fld. 11/6, 20/12, 20/11, 20/2
CFSTI Prices: HC $1.60 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS SCIENCE
ON THE MEANING OF THE FAULT PARAMETERS MEASURED BY X-RAYS; I. STRAIN DISTRIBUTIONS IN SHOCK-LOADED SINGLE CRYSTALS OF COPPER; II.
Technical rept.,
by R. J. De Angelis, and J. B. Cohen. 15 Feb 66, 14p. Rept. no. tr-9,
Contract Nonr-1228 (20) Proj. NR-031-680,

Unclassified report

Descriptors: (*Copper, X-ray diffraction analysis), (*Crystal lattice defects, Copper), (*X-ray diffraction analysis, Copper), Copper alloys, Gold alloys, Intermetallic compounds, Single crystals, Electron microscopy, Loading (Mechanics), Shock (Mechanics), Strain (Mechanics), Distribution

A comparison was made between the intensity of twin faults seen in the electron microscope and the effects on the diffraction pattern of a single crystal of copper shock-loaded at 435 kb. The Fourier coefficients of peaks like the (111), (222), (444) and (555) are effected by twin faults and that those of the (333) are not. From this fact the twin fault density can be calculated and compared with the electron microscopic results. Excellent agreement was obtained. The strain distributions in shockloaded copper was shown to be Gaussian. (Author)

AD-628 977 Fld. 11/6, 20/11
CFSTI Prices: HC $11.60 MF $0.75
COLORADO SCHOOL OF MINES RESEARCH FOUNDATION INC GOLDEN
THE MECHANICAL PROPERTIES OF COPPER AT HIGH STRAIN RATES. VOLUME II. ANALYTICAL AND EXPERIMENTAL PLASTIC STRAIN PROFILES IN HIGH VELOCITY IMPACT.
Rept. for 1 May 63-28 Feb 65,
by J. D. Lubahn, and R. A. Houidobre. Feb 66, 113p. Contract AF 29 (601)-6042, Proj. AF-7811, Task 781105,
AFWL TR-65-121-Vol-2

Unclassified report

Descriptors: (*Copper, Strain (Mechanics)), (*Strain (Mechanics), Copper), (*Impact tests, Copper), Mechanical properties, Plasticity, Rods, Numerical method and procedures, Shock waves, Propagation, Deformation

Cold-drawn copper rods were end-impacted with projectiles having lengths of 1 to 5 inches and initial velocities of 500 to 1240 in./sec, and the resulting plastic strain profiles were measured. Also the strain profiles were calculated using a numerical method based on the method of characteristics and on material properties which are rate sensitive. The reliability of the concepts employed in the calculations was indicated by the good agreement between the measured and calculated strain pr files. Strain rate exponent, defined as the slope the curve of log stress versus log plastic strain ra was found by these calculations to increase wi increasing strain rate, reaching a value of abo 0.04 at a plastic strain rate, reaching a value about 0.04 at a plastic strain rate of 400/sec. (A thor)

AD-629 019 Fld. 11/6
MARTIN CO BALTIMORE MD
VACUUM EFFECTS ON THE TENSILE AN CREEP PROPERTIES OF ALUMINUM,
by H. Shen, S. E. Podlaseck, and I. R. Kramer. 8 Jun 65, 7p. Contract AF 49 (638)-1455, AF 49 (638)-946 Proj. AF-9782, Task 978202, AFOSR 65-2737

Unclassified repor

Availability: Published in Transactions of the Metallurgical Society of AIME v233 p1933-8 No 1965. Copies to DDC users only.

Descriptors: (*Aluminum, Vacuum), Tensile properties, Creep, Heat of activation, Surface properties, Stresses, Deformation, Hardening, Controlled atmospheres

The tensile and creep properties of aluminum i vacuum was investigated. It was found that th general effect of a vacuum environment was to re duce the rate of work hardening. Results obtaine from creep tests showed that lowering the tes pressure from 0.0002 to 2 x 10 to the minus 7th power torr produced a decrease in the activation energy as much as 500 cal per mole. An attempt is made to explain these effects in terms of how the surface-stress field of a specimen may be affected by a vacuum environment during plastic deformation. (Author)

AD-629 068 Fld. 11/6, 7/4
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO
PLASMA ARC STUDIES FOR ALLOY ANALYSIS.
Technical rept., Jan-Sep 65,
by James H. Muntz. Dec 65, 22p. Rept. no. afml-TR-65-334,
Proj. AF-7360, Task 736005,

Unclassified repor

Descriptors: (*Alloys, Chemical analysis), (*Spectroscopy, Plasma jets), (*Plasma jets, Spectroscopy), Solutions, Standards, Preparation, Test methods, Performance (Engineering)

An evaluation of the plasma arc spectrochemical technique for alloy analysis was made. Matrix effects were studied and the technique was applied to the analysis of aluminum, cobalt, iron, and nickel base alloys. The advantages and disadvantages of the method are given. (Author)

AD-629 105 Fld. 11/6
CFSTI Prices: HC $3.00 MF $0.75
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
CRACK RESISTANCE PROPERTIES OF HIGH STRENGTH ALUMINUM ALLOYS.
Technical research rept.,
by Carl M. Carman. Dec 65, 62p. Rept. no. r-1789,
Proj. DA-1C024401A328,

Unclassified repor

Descriptors: (*Aluminum alloys, Fracture (Mechanics)), (*Fracture (Mechanics), Aluminum alloys), Zinc alloys, Magnesium alloys, Copper alloys, Fractography, Toughness, Strain hardening

The fracture toughness of both commercial and high purity aluminum alloys of the 7000 and 2000

series was determined by means of the center notched sheet specimen. The instability conditions described here give reproducible and well defined values of fracture toughness. For the very high strength aluminum alloys, the four inch wide specimen is sufficiently large to give accurate values of fracture toughness. Both the compliance and photographic method give the same value of fracture toughness, provided the proper experimental conditions are met. The testing conditions for the 2000 series of aluminum alloys do not conform to the normal requirements for simple fracture mechanics analysis, but the data may be analyzed within the framework of a refined instability model. The fracture toughness of the 2000 series of aluminum alloys is greater than the fracture toughness of the 7000 series. Reduction of iron and silicon contents results in an upgrading of the fracture toughness for both 7075-T6 and 2024-T4 aluminum alloys. Quantitative fractography gives some insight into the mechanisms which may be responsible for the upgrading of the fracture toughness. (Author)

AD-629 106 Fld. 11/6, 11/2, 11/3, 11/9
CFSTI Prices: HC $5.00 MF $1.00
DEPARTMENT OF THE ARMY WASHINGTON D C
OXIDATION-RESISTANT MATERIALS, A HANDBOOK,
by E. L. Gakman, and K. P. Shchedrov. 27 Jan 66, 160p. Rept. no. 1-8834, TT 66-60693

Unclassified report

Trans. of mono. Zharostoikie Materialy, Spravochnoe Posobie, Moscow, 1965 p1-166.

Descriptors: (*Heat resistant materials, Handbooks), Materials, Oxidation, Steel, Corrosion-resistant alloys, Iron, Castings, Ceramic materials, Cermets, Coatings, Protective treatments, Metal coatings, Ceramic coatings, Plastics, Corrosion inhibition, USSR

This book systematizes reference data on the physical and chemical and technological properties of heat-resistant steels, special alloys, and cast irons. The characteristics, properties, and production technology are given of oxidation resistant and thermostable non-metallic materials, cermets and plastics. The book is intended for engineering and technical personnel concerned with questions of testing and applying high-temperature materials. It may also be used by the workers of shop and plant laboratories. (Author)

AD-629 395 Fld. 11/6
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF ENGINEERING RESEARCH
DIE KOBALTECKE IM DREISTOFFSYSTEM KOBALT-NIOB-BOR (THE COBALT PHASE IN THE TERTIARY SYSTEM OF COBALT-NIOBIUM-BORON),
by H. H. Stadelmaier, and J. D. Schobel. 1965, 2p. Contract DA-31-124-ARO (D)-277, AROD 5010:6

Unclassified report

Text in German.

Availability: Published in Metall (West Germany) v20 n1 p31-3 1966. Copies to DDC users only.

Descriptors: (*Cobalt alloys, Phase studies), (*Phase studies, Cobalt alloys), Niobium alloys, Boron alloys, West Germany

AD-629 500 Fld. 11/6, 20/11
CFSTI Prices: HC $5.00 MF $0.75
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF MECHANICS
AN EXPERIMENTAL INVESTIGATION OF THE PORTEVIN-LE CHATELIER EFFECT IN DEAD ANNEALED COMMERCIAL PURITY ALUMINUM.
Technical rept.,
by William N. Sharpe,Jr.. Feb 66, 112p. Rept. no. TR-12,
Contract AF 49 (638)-1067, Proj. AF-9782, Task 978201,
AFOSR 66-0127

Unclassified report

Descriptors: (*Grain boundaries, Deformation), (*Aluminum, Deformation), (*Metallic crystals, Failure (Mechanics)), Single crystals, Stresses, Strain (Mechanics), Shear stresses, Metallography

The purpose of the investigation is to determine whether or not macroscopic grain boundaries affect the Portevin-Le Chatelier behavior. Polycrystal, single crystal, and bicrystal specimens of commercial purity aluminum are subjected to constant tensile loading at room temperature. The polycrystalline samples are discovered to exhibit continual repeated yield till failure. In contrast, the single crystals exhibit two groups of steps, each beginning at a reproducible value of resolved shear stress. Thus the existence of the two group behavior is independent of orientation. The resolved shear stress of the initial step in a single crystal, when related through the Taylor aggregate theory, predicts the observed initial step stress in the polycrystals. Consideration of bicrystals and crystals with stray grains shows that the presence of grain boundaries tends to proliferate repeated yield, i.e. they show continual steps. However, the initial step is not affected by these boundaries. Hence, the initial step of a specimen is the result of intragranular yielding, but the following stepare affected by grain boundaries. (Author)

AD-629 598 Fld. 11/6
CFSTI Prices: HC $4.00 MF $0.75
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER
HOT CORROSION MECHANISM STUDIES.
Final rept.
15 Feb 66, 113p. Contract N600 (61533)-63219,

Unclassified report

Descriptors: (*Corrosion, High-temperature research), (*Nickel alloys, Corrosion), (*Cobalt alloys, Corrosion), Chromium alloys, Corrosion resistance, Reaction kinetics, Sulfates, Metallography, Environmental tests, Gas turbines, Oxygen

The occurrence and nature of 'hot corrosion' was investigated. The elements nickel and cobalt, their binary alloys with chromium, and simple ternary alloys composed of third elements added to chromium-nickel and chromium-cobalt, were studied. Reaction kinetics of sulfate-induced oxidation were studied by thermal balance techniques. Hot corrosion severity at 1675, 1750, and 1900F was determined for the prepared samples in burner rig tests that simulate actual engine environments. The nature of the corrosive attack was studied morphologically, largely by metallographic examinations. Hot corrosion enhanced oxidation has been shown to follow sulfidation attack after sulfate reduction by the basis metal. The effects of sulfate concentrations, oxygen pressures, surface oxide film thicknesses, and temperatures were determined for elemental nickel, cobalt, and some of their alloys with chromium. (Author)

AD-629 644 Fld. 11/6
CFSTI Prices: HC $3.60 MF $0.50
WATERTOWN ARSENAL LABS MASS
METALLOGRAPHIC METHODS ETCHING FOR BAINITIC FINE CARBIDES. A METALLOGRAPHIC METHOD FOR REVEALING THE FINE CARBIDES IN BAINITE FORMED DURING CONTINUOUS COOLING IN A NICKEL-CHROMIUM-MOLYBDENUM COMPOSITION,
by Everett L. Reed, and Harold G. Carter. 29 Oct 48, 25p. Rept. no. wal-132/13, Proj. WAL-14.8-U

Unclassified report

Descriptors: (*Ordnance steel, Metallography), (*Metallography, Ordnance steel), Etching, Carbides, Bainite, Nickel alloys, Chromium alloys, Molybdenum alloys, Tempering

In this investigation a nickel-chromium-molybdenum steel with three carbon contents was selected. These steels are typical of medium heavy armor and certain other ordnance applications. An etching reagent containing 4% picral and 0.01% hydrochloric acid was developed which clearly revealed very fine carbides and their arrangement in bainite formed at low temperatures, whereas other commonly used etching reagents either slightly brought out the very fine carbides or masked them by strongly etching the matrix. The coarser carbides present in bainite formed at high temperatures are shown by the commonly used etching reagents. Tempered bainite was differentiated from tempered martensite after tempering at various temperatures for two (2) hours and after a prolonged tempering for thirty-four (34) hours at 1200 F. (Author)

AD-629 726 Fld. 11/6
CFSTI Prices: HC $3.00 MF $0.50
WESTON INSTRUMENTS INC NEWARK NJ
ALLOYS OF IMPROVED ELASTIC PROPERTIES.
Final rept., pt. 1,
by R. E. Busch, R. T. Luedeman, and P. M. Gross. Feb 66, 53p. Contract DA-30-069-AMC-597 (X)
AMRA CR-65-02/1-Pt-1

Unclassified report

See also AD-629 727.

Descriptors: (*Copper alloys, Elasticity), Aluminum alloys, Nickel alloys, Strain (Mechanics), Stresses, Martensite, Transformations, Fatigue (Mechanics), Hysteresis, Creep, Mechanical properties

The effect of the reversible martensitic transformation on the mechanical properties of a copper-aluminumnickel alloy was studied. Stress-strain parameters were investigated from -300F to 500F. Elastic strains as high as 24.0% were achieved. Mechanical hysteresis was found in the martensite phase but non-existent in the beta phase if certain temperature-strain variables were not exceeded. Fatigue life was determined for both phases and found to be approximately 100 times better than annealed brass at 2.0% total strain. A survey of the literature revealed additional characteristics of the transformation found in this class of alloys, such as the variation in elastic constants, driving force for the reaction and the modes of elastic flow. (Author)

AD-629 727 Fld. 11/6
CFSTI Prices: HC $4.00 MF $0.75
WESTON INSTRUMENTS INC NEWARK NJ
ALLOYS OF IMPROVED ELASTIC PROPERTIES.
Final rept., pt. 2,
by R. E. Busch, R. T. Luedeman, and P. M. Gross. Feb 66, 76p. Contract DA-30-069-AMC-597 (X)
AMRA CR-65-02/1-Pt-2

Unclassified report

See also AD-629 726.

Descriptors: (*Copper alloys, Elasticity), Aluminum alloys, Nickel alloys, Alloys, Single crystals, Strain (Mechanics), Failure (Mechanics), Graphics, Stresses

AD-628 939 See Fld. 20/2

AD-628 979 See Fld. 13/8

AD-628 985 See Fld. 20/2

AD-628 992 See Fld. 13/8

AD-629 013 See Fld. 11/7

AD-629 048 See Fld. 20/12

AD-629 185 See Fld. 20/3

AD-629 195 See Fld. 20/12

AD-629 413 See Fld. 11/4

AD-629 480 See Fld. 7/4

AD-629 483 See Fld. 7/4

AD-629 596 See Fld. 9/5

AD-629 701 See Fld. 20/2

AD-629 708 See Fld. 13/8

AD-629 720 See Fld. 11/9

11/7. MISCELLANEOUS MATERIALS

AD-629 013 Fld. 11/7, 20/12, 7/4, 11/6, +
CFSTI Prices: HC $4.00 MF $1.00
STANFORD UNIV CALIF CENTER FOR MATERIALS RESEARCH
ANNUAL TECHNICAL REPORT, JULY 1, 1964 TO JUNE 30, 1965.
30 Jun 65, 149p. Contract SD-87,
Unclassified report

See also AD-610 857.

Descriptors: (*Materials, Scientific research), (*Soild state physics, Scientific research), Semiconductors, Acoustics, Catalysis, Optical phenomena, Quantum mechanics, Crystals, Metals, Reaction kinetics, Thermodynamics, Polymers, Concrete, Spectroscopy, Mechanics, Photoelectric effect, Chemical reactions, Magnetic materials

This fourth Annual Technical Report includes information on the total research activity related to the science of materials at Stanford University during the period July 1, 1964 to June 30, 1965. The report contains descriptions of the research programs under way during the period, arranged alphabetically by principal investigator. Also included are lists of publications, Ph.D. dissertations, and relevant personnel.

AD-629 439 Fld. 11/7, 9/1, 13/5
CFSTI Prices: HC $2.00 MF $0.50
GENERAL ELECTRIC CO BALTIMORE MD INSULATOR DEPT
ENGINEERING SERVICES IN CONNECTION WITH TEST OF EXISTING OPEN AND CLOSED TYPE GUY INSULATORS AND A FEASIBILITY STUDY OF IMPROVED DESIGNS FOR HIGH STRENGTH ALUMOWELD CABLES.
Final technical rept.,
by N. F. Walters, J. Talentinow, and H. A. Frey.
17 Feb 66, 46p. Rept. no. TR-LK-805,
Contract NBy-62174,
Unclassified report

Descriptors: (*Cables (Mechanical), Electric insulation), (*Electric insulation, Performance (Engineering)), Aluminum, Transmission lines, Couplings, Reliability

Results of testing strings of open and closed type fail-safe guy insulators show a linear relationship between peak-wet flashover rating and number of units in a string. The effect of grading rings and spacing of insulator units is demonstrated. (Author)

11/8. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-628 914 Fld. 11/8, 7/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
ANALYSIS FOR ACYL COMPONENTS OF NEOPENTYL POLYOL ESTER LUBRICANTS.
Interim rept.,
by J. G. O'Rear, and P. J. Sniegoski. 5 Jan 66,
10p. Rept. no. NRL-6338,
Proj. RAP-41-R001/652-1/F012-03-05,
Unclassified report

Descriptors: (*Lubricants, Chromatographic analysis), (*Esters, Impurities), (*Gas chromatography, Lubricants), Carboxylic acids, Hydrolysis, Organic oxygen compounds, Alcohols

Methods of gas chromatography were applied to the analysis of acyl components in commercial neopentyl esters and in lubricant formulations derived from such esters. Analysis of the free acids produced by hydrolysis of the samples revealed that the ester lubricants were derived from normal acids ranging from C5 to C10; isovaleric acid was present in a few samples. Average acid chain length varied from 5.1 to 7.5. From 20 to 83% of the acyl groups found in the lubricant formulations were from n-valeric acid. All results were in good agreement with previous results obtained by nuclear magnetic resonance spectroscopy. (Author)

AD-629 039 Fld. 11/8, 20/4, 13/9
CFSTI Prices: HC $3.00 MF $0.50
MECHANICAL TECHNOLOGY INC LATHAM N Y
CONDITIONS FOR THE RUPTURE OF A LUBRICATING FILM.
Technical rept.,
by J. C. Coyne, and H. G. Elrod Jr.. Dec 65,
57p. Rept. no. mti-65TR58,
Contract Nonr-3731 (00) (FBM)
Unclassified report

Descriptors: (*Lubrication, Hydrodynamics), (*Lubricants, Flow separation), Films, Vapors, Cavitation, Bubbles, Stagnation point, Bearings, Boundary layer, Rupture

An analysis is made to determine the shape of the film-vapor interface when a thin liquid film separates from a stationary surface and is swept away on an opposing moving surface. Situations in which variations of this phenomenon occur include cavitation in bearings, the spreading of thin films, and the movement of bubbles in narrow spaces. The results of the analysis show that for a fixed attachment height the flow carried in the separating film decreases with decreasing N = (3mu (U)/T) to the 1/3rd power. Stagnation points occur on the interface (with upstream recirculation) at a film height of 3F/U where F is the flow per unit film width and U is the plate velocity. As N decreases, the flow decreases; and the stagnation point moves down the interface toward the moving plate. A second stagnation point always occurs at the point of film attachment. A second important result is that film separation occurs in a distance of about one plate clearance. Because this transition distance is very small, the analysis is applicable to situations in which the plate velocity is not normal to the film edge, e.g. striated cavitation in bearings. The upstream transition distance is shown to be a few plate clearances.

AD-629 415 Fld. 11/8
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
MOLTEN METALS AS HIGH-TEMPERATURE LUBRICANTS,
by N. M. Fialko, and A. I. Dintses. 20 Jan 66,
11p. Rept. no. FTD-TT-65-1447,
TT 66-60721
Unclassified report

Unedited rough draft trans. of Khimiya i Tekhnologiya Topliv i Masel (USSR) v9 n3 p54-8 1964

Descriptors: (*Lubricants, Liquid metals), (*Liquid metals, Lubricants), Wear resistance, Heat-resistant materials, USSR, Corrosion, Preparation

AD-629 674 Fld. 11/8, 13/9, 11/4
CFSTI Prices: HC $2.60 MF $0.50
ROCK ISLAND ARSENAL ILL
SELF-LUBRICATING MATERIALS.
Technical rept.,
by George P. Murphy Jr.. Jan 66, 27p. Rept. no. tr-66-327,
Proj. DA-1C024401A107,
Unclassified report

Descriptors: (*Lubrication, Bearings), (*Lubricants, Composite materials), (*Composite materials, Lubricants), Epoxy plastics, Wear resistance, Friction, Solids, Molybdenum compounds, Sulfides, Antimony compounds, Oxides, Lead compounds, Phosphites

The report covers the work done toward developing a self-lubricating bearing material. This bearing material was of the thermosetting resin, lubricant filled, type. Formulations consisting of an amine cured epoxy resin filled with various dry lubricants at various concentration levels were evaluated by means of a modified Shell Four Ball Wear Test and the Falex Wear Test. The best formulations consisted of the epoxy resin filled with 50-70% of a mixture of molybdenum disulphide, antimony trioxide and dibasic lead phosphite. These materials are effective under the following tentative conditions: maximum load 4000 psi, maximum speed 50 ft/minute, temperature range of 80 to 300 F. The limiting pressure velocity value is 15,000 - 20,000. Under low load, low speed conditions coefficient of frictions of 0.05-0.10 and a wear rate of 0.1 mg/hr was obtained. Generally as load and speed increase friction and wear rate also increases. (Author)

AD-629 720 See Fld. 11/9

11/9. PLASTICS

AD-629 165 Fld. 11/9, 7/3, 20/12
CFSTI Prices: HC $4.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PLASTICS (SELECTED ARTICLES).
5 Nov 65, 43p. Rept. no. FTD-TT-65-936,
TT 66-60695
Unclassified report

Unedited rough draft trans. of Plasticheskie Massy (USSR) n11 p1-9, 37-9, 42-5 1964.

Descriptors: (*Polymers, Synthesis (Chemistry)), (*Polyvinyl chloride, Semiconductors), (*Halocarbon plastics, Deformation), Aldehydes, Ketones, Polymerization, Aromatic compounds, Heterocyclic compounds, Creep

Contents: Progress in synthesis of new polymers, by M. M. Koton, Study of the deformation of filled fluoroplastic materials, by S. N. Ganz and V. D. Parkhomenko, Semiconductor polyvinyl chloride compositions, by Yu. N. Van-Gaut, L. A. Ol'shanskaya and R. S. Sokolova.

AD-629 281 Fld. 11/9, 7/3
STANFORD UNIV CALIF DEPT OF CHEMISTRY
STEREOREGULARITY AND UNPERTURBED DIMENSIONS OF ISOTACTIC POLY-ALPHA-OLEFINS,
by P. J. Flory, J. E. Mark, and A. Abe. 27 Jul 65,
6p. Contract AF 49 (638)-1341,
AFOSR 66-0316
Unclassified report

Availability: Published in Polymer Letters v3 p973-6 1965. Copies to DDC users only.

Descriptors: (*Vinyl plastics, Molecular structure), (*Stereochemistry, Polymers), Alkenes, Propenes, Chemical bonds

The occurrence of some of the units of the chain in non-isotactic structural arrangements offers the only plausible explanation for the striking discordance between theory and experiments on allegedly stereoregular vinyl polymers having the hydrocarbon substituents R=CH3, C2H5, n-C3H7, and C6H5. The atypical structures probably are syndiotactic units; a further possibility is occurrence of an occasional head-to-head pair of units. Typical isotactic vinyl polymers we concluded to possess a small fraction of atactic units, and these are regarded as responsible for depressing the dimensions of the random coil. The facts that various isotactic polymers including polypropylene, poly-n-butene-1, and poly-n-pentene-1 are highly crystalline and spherulitic, and that they exhibit fairly sharp melting points, show unequivocally that their crystalline domains greatly exceed the average length (ca. 10-15 monomer units) of an isotactic sequence. The syndiotactic units, and/or other stereo-irregular units, must therefore be incorporated in crystallites.

AD-629 720 Fld. 11/9, 11/1, 22/2, 9/5, +
CFSTI Prices: HC $3.00 MF $1.50
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
SPACE MATERIALS HANDBOOK.
Supplement 1 to 2 ed. Space Materials Experience,
by John B. Rittenhouse, and John B. Singletary. 1966, 271p. Contract AF 33 (615)-2060, Proj. AF-7381, Task 738103,
NASA SP-3025 ,ML TDR-64-40-Suppl-1
Unclassified report

See also AD-460 399.

Descriptors: (*Materials, Space environmental conditions), (*Handbooks, Materials), (*Spacecraft, Materials), Thermal insulation, Coatings, Optical materials, Lubricants, Bearings, Adhesives, Sealing compounds, Structural ports, Organic materials, Antennas, Solar cells, Batteries + components, Foams, Foils, Alloys, Ceramic materials

The report consists of two parts. In the first, materials used in successfully orbited spacecraft are reviewed and tabulated. These materials are discussed, insofar as information is available, as to their contribution to spacecraft performance. Data on the effects of the space environment on materials, as measured in space, are tabulated and discussed; particular attention is given to correlating these data with measurements made with simulated environments. The second part of the report recommends specific materials for use in various functional categories on a spacecraft. These recommendations are based on results from both simulated environmental testing and the performance of materials in space as given in the first part. Reasons for the materials choices are discussed and some of the further limitations on these choices due to environmental factors are pointed out. (Author)

AD-629 733 Fld. 11/9, 13/8, 9/1
CFSTI Prices: HC $1.00 MF $0.50
GENERAL ELECTRIC CO HUDSON FALLS N Y CAPACITOR DEPT
PRODUCTION ENGINEERING MEASURE POLYCARBONATE PLASTIC FILM.
Quarterly rept. no. 3, 18 Nov 65-18 Feb 66. 18 Feb 66, 24p. Contract DA-36-039-AMC-06165 (E)
Unclassified report

See also AD-626 375.

Descriptors: (*Polyester plastics, Dielectric films), (*Dielectric films, Polyester plastics), Manufacturing methods, Dielectric properties, Processing, Thickness, Dielectric properties, Friction, Extrusion, Tensile properties, Finishes + finishing, Surface properties, Films

This report contains the details of the progress made during the second quarter of the polycarbonate plastic film program. (a) An automatic feed system has been designed, purchased, installed, debugged and is in operation (b) Optimization of extrusion conditions has been essentially completed with the addition of an in line beta gauge, improvement of edge slitting and the elimination of die hang-up and degradation (c) Optimization of drafting and tentering is being approached after solving many difficult equipment problems. In addition, efforts to make drafting and tentering synchronous has been successful. (Author)

AD-629 013 **See Fld. 11/7**

AD-629 106 **See Fld. 11/6**

AD-629 393 **See Fld. 7/4**

AD-629 554 **See Fld. 7/3**

AD-629 747 **See Fld. 7/4**

AD-629 751 **See Fld. 7/3**

Field 12-MATHEMATICAL SCIENCES

12/1. MATHEMATICS AND STATISTICS

AD-628 888 Fld. 12/1
CFSTI Prices: HC $4.60 MF $0.50
MIDWEST RESEARCH INST KANSAS CITY MO
RATIONAL APPROXIMATIONS TO GENERALIZED HYPERGEOMETRIC FUNCTIONS.
Scientific interim rept. for 1 May 64-9 Apr 65, by Jerry L. Fields. Nov 65, 42p. Contract AF 33 (657)-8872, Proj. AF-7071, Task 70712, ARL 65-227
Unclassified report

Descriptors: (*Approximations (Mathematics), Special functions (Mathematical)), (*Special functions (Mathematical), Approximation (Mathematics)), Theorems, Functional analysis, Numerical analysis, Bessel functions

Under weak restrictions on the various free parameters, general theorems for rational representations of the generalized hypergeometric functions, and certain Meijer G-functions are developed. Upon specialization, these theorems yield a sequency of rational approximations which converge to the desired limit. Two numerical examples are included, the Bessel functions J sub o (z) and K sub o (z), of the first and third kind, respectively. (Author)

AD-628 934 Fld. 12/1, 3/3
CFSTI Prices: HC $1.00 MF $0.50
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH MATHEMATICS RESEARCH LAB
NUMERICAL INTEGRATION OF AN ORBIT AND ITS CONCOMITANT VARIATIONS BY RECURRENT POWER SERIES,
by Andre Deprit, and R. V. M. Zahar. Dec 65, 18p. Rept. no. D1-82-0501 ,Mathematical note 445
Unclassified report

Also available from the authors.

Descriptors: (*Power series, Integration), (*Integration, N-body problem), (*N-body problem, Numerical analysis), Celestial mechanics, Matrix algebra, Hamiltonian

Power series expansions (with coefficients obtained by recurrence formulas) are more efficient than other integration procedures for computing concurrently an orbit and the resolvent matrix of its variational equations, in the Restricted Problem of Three Bodies. For the same requirements on accuracy, the series expansions use only about 30 per cent of the computing time of the multi-step procedures, and only 12 to 15 per cent of the computing time of the Runge-Kutta-Nystrom method. (Author)

AD-628 947 Fld. 12/1
CFSTI Prices: HC $6.00 MF $1.25
MINNESOTA UNIV MINNEAPOLIS DEPT OF STATISTICS
RANK ORDER PROBABILITIES: TWO-SAMPLE NORMAL SHIFT ALTERNATIVES.
Technical rept.,
by Roy C. Milton. Jan 66, 233p. Rept. no. tr-53a,
Contract Nonr-710 (31), Proj. NR-042-003,
Unclassified report

See also AD-614 131.

Descriptors: (*Probability, Tables), Statistical analysis, Sampling, Statistical tests, Decision theory

Let Z denote a random vector of m+n zeros and ones where the i-th component of Z is 0 (1) if the i-th order statistic of the independent random variables (X sub 1,...,X sub m, Y sub 1,...,Y sub n) is an X (Y) and the X's (Y's) are normally distributed with mean O (D) and variance 1. Values of the probability of the rank order z, are tabulated to 9 decimal places for all z for $1<n<m<7$ and $n=1$, $m=8$ (1)12; D=0 (.2)1,1.5,2,3. These tables are used to find the exact power of the Wilcoxon, c sub 1, median, and Kolmogorov-Smirnov two-sample tests for location against the normal shift alternative for sample sizes $1<n<m<7$ and for one-sided and two-sided tests at nominal levels of significance = .25, .10, .05, .025, .01, .005. Selected power and efficiency comparisons are made among these tests and with the two-sample Student's t-test. The most powerful rank test is also considered. Sequential two-sample rank tests based on the likelihood ratios of the probabilities of the vector z and of the rank sum are described, extending the work of Wilcoxon et al (Biometrics, 1963) to the case of the normal shift hypothesis. Tables are presented which facilitate the use of these tests, and values of the OC and ASN functions are given. A multiple decision or ranking procedure is considered for selecting a subset of s populations from among k normal populations with common variance o (2) such that at least c of the t populations with largest means are among the s populations selected. (Author)

AD-629 023 Fld. 12/1, 20/10
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
ON THE GREEN'S FUNCTION METHOD FOR EVALUATING PERTURBATION SUMS,
by R. A. Bonham. 19 Feb 65, 3p. Contract AF-AFOSR-602-64, Proj. AF-9760 Task 976002, AFOSR 65-2149
Unclassified report

Prepared in cooperation with Tokyo Univ. (Japan). Dept. of Chemistry.

Availability: Published in J Phys. Soc. Japan, v19 p1098-9 1965. Copies to DDC users only.

Descriptors: (*Green's function, Perturbation theory), (*Perturbation theory, Green's function), Wave functions, Polarization, Atoms, Power series

AD-629 028 Fld. 12/1
SYRACUSE UNIV N Y
ENTIRE AND MEROMORPHIC FUNCTIONS WITH ASYMPTOTICALLY PRESCRIBED CHARACTERISTIC,

by Albert Edrei, and Wolfgang H. J. Fuchs. 19 Aug 63, 15p. Contract AF 49 (638)-571,NSF-GP-1645 Proj. AF-9749, Task 974902, AFOSR 65-2159

Unclassified report

Availability: Published in The Canadian Journal of Mathematics v17 p383-95 1965. Copies to DDC users only.

Descriptors: (*Functions, Theory), Complex variables, Measure theory, Asymptotic series

AD-629 029 Fld. 12/1
SYRACUSE UNIV N Y DEPT OF MATHEMATICS
SUMS OF DEFICIENCIES OF MEROMORPHIC FUNCTIONS,
by Albert Edrei. 29 Mar 64, 32p. Contract AF 49 (638)-571, Proj. AF-9749, Task 974902, AFOSR 65-2158

Unclassified report

Prepared in cooperation with Imperial College of Science and Technology, London (England).

Availability: Published in Journal d'Analyse Mathematique v14 p79-107 1965. Copies to DDC users only.

Descriptors: (*Functions, Sequences), Complex variables, Inequalities, Theorems

AD-629 032 Fld. 12/1
CHICAGO UNIV ILL DEPT OF MATHEMATICS
A FAMILY OF SPECTRAL OPERATIONS,
by Tzee-Char Kuo. 25 Jan 65, 4p. Contract AF-AFOSR-520-64, AFOSR 65-2119

Unclassified report

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.

Availability: Published in Proceedings of the National Academy of Sciences, v53 n3 p658-61 Mar 1965. Copies to DDC users only.

Descriptors: (*Mapping (Transformations), Theory), Algebraic topology, Operators (Mathematics)

AD-629 035 Fld. 12/1
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
THE INVERSE MULTIPLIER FOR ABELIAN GROUP DIFFERENCE SETS,
by Eugene C. Johnsen. 4 Sep 63, 14p. Contract AF-AFOSR-698-65, Proj. AF-9749, Task 974901, AFOSR 65-2067

Unclassified report

Availability: Published in The Canadian Journal of Mathematics v16 p787-96 1964. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), Combinatorial analysis), (*Combinatorial analysis, Groups (Mathematics)), Set theory, Mapping (Transformations)

AD-629 042 Fld. 12/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
ROUTINE FOR IMPROVING THE ACCURACY OF THE ROOTS OF POLYNOMIALS WITH REAL COEFFICIENTS.
Memorandum rept.,
by Alene K. Depue. Aug 65, 39p. Rept. no. BRL-MR-1687, Proj. RDT/E-1P014501A14B,

Unclassified report

See also AD-406 436.

Descriptors: (*Polynomials, Real numbers), (*Programming (Computers), Polynomials), Complex numbers, Iterative methods, Effectiveness

A routine has been developed to compute the real and complex conjugate roots for a polynomial with real coefficients. When the polynomial is of odd degree, the routine locates one real root and then reduces the polynomial to an even degree. The remainder of the roots are located in pairs by using factors and Bairstow's Algorithm. There is no special provision to detect multiple roots and hence the routine may fail or converge to incorrect values. Computing roots of polynomials related to the Transient Response of a Viscoelastic Torsional Pendulum illustrated the effect that small errors in computed roots have on subsequent computations. A need arose to eliminate as many errors as possible. The routine tries to eliminate most errors in extracting roots by: scaling; using equations yielding least error; refining extracted roots, both real and imaginary, to a prescribed accuracy by the Newton-Raphson Method. Other error checks are included to achieve as much accuracy as possible. Several examples are included. (Author)

AD-629 051 Fld. 12/1
CALIFORNIA UNIV BERKELEY
MULTIPLIERS OF FOURIER TRANSFORM IN A HALF-SPACE,
by E. Shamir. 1965, 6p. Contract AF-AFOSR-553-64, AFOSR 65-2146

Unclassified report

Availability: Published in Bulletin of the American Mathematical Society v71 n1 p165-7 Jan 1965. Copies to DDC users only.

Descriptors: (*Integral transforms, Functional analysis), Boundary value problems, Operators (Mathematics)

AD-629 060 Fld. 12/1, 9/5
CFSTI Prices: HC $2.00 MF $0.50
STATE UNIV OF NEW YORK STONY BROOK
A DISTRIBUTIONAL K TRANSFORMATION WITH APPLICATIONS TO TIME-VARYING ELECTRICAL NETWORKS.
Scientific rept.,
by A. H. Zemanian. 27 Sep 65, 46p. Rept. no. 54,Scientific-8
Contract AF 19 (628)-2981, Proj. AF5628, Task 562806, AFCRL 65-789

Unclassified report

Descriptors: (*Integral transforms, Distribution theory), (*Distribution theory, Integral transforms), (*Electrical networks, Integral transforms), Bessel functions

AD-629 083 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
REAL BANACH ALGEBRAS,
by Lars Ingelstam. 11 Mar 64, 35p. Contract AF-AFOSR-407-63, Proj. AF-9749 Task 974902, AFOSR 65-2611

Unclassified report

Availability: Published in Arkiv For Matematik, v5 n16 p239-70 1964. Copies to DDC users only.

Descriptors: (*Algebras, Theory), Groups (Mathematics), Functional analysis

This article contributes to the theory of real Banach algebras in three central areas: (1) the structure of the (quasi-) regular group, (2) abstract characterization of real function algebras, and (3) the relation between real B- and C-algebras.

AD-629 085 Fld. 12/1
NEW YORK UNIV N Y
GENERALIZED EIGENVECTORS AND SEPARATION OF VARIABLES.
Revised ed.,
by Maurice Machover. 11 Sep 63, 22p. Contract AF-AFOSR-62-108, AFOSR 65-2735

Unclassified report

Revision of Manuscript submitted 19 Apr 63.

Availability: Published in Reprint, Mar 1965. Copies to DDC users only.

Descriptors: (*Matrix algebra, Partial differential equations), (*Partial differential equations, Matrix algebra), Green's function, Complex variables, Boundary value problems

AD-629 107 Fld. 12/1, 6/3
CFSTI Prices: HC $1.60 MF $0.50
CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS
SOME CONSIDERATIONS ON EVOLUTIONARY ALGORITHMS.
Technical rept.,
by Joseph A. Goguen. Feb 66, 19p. Contract Nonr-222 (85) ,Nonr-3656 (08)

Unclassified report

See also AD-602 903, AD-433 855.

Descriptors: (*Algorithms, Search theory), (*Search theory, Algorithms), Biology, Genetics, Stochastic processes, Linear programming, Optimization, Artificial intelligence

This paper contains some results and speculations inspired by and related to H. J. Bremermann's work on evolutionary search. Bremermann's work studies the behavior of evolutionary alogarithms on two wellunderstood problems, linear programs and (in some earlier experiments) systems of linear equations. It is then possible to judge the effectiveness of various evolutionary methods for these problems by comparing with known results and alogarithms. Evolutionary alogrithms are search procedures, and therefore fall into the general area of artificial intelligence. Some of the results here may have relevance to this broader topic. The use of evolutionary analogy and terminology may suggest some significance for biology. This is all discussed. A theorem is presented which demonstrates the value of 'mutation'.

AD-629 132 Fld. 12/1, 4/1
CFSTI Prices: HC $1.60 MF $0.50
RAND CORP SANTA MONICA CALIF
INITIAL VALUE METHODS FOR THE BASIC BOUNDARY VALUE PROBLEM AND INTEGRAL EQUATION OF RADIATIVE TRANSFER,
by H. H. Kagiwada, and R. E. Kalaba. Feb 66, 19p. Rept. no. RM-4928-PR, Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Boundary value problems, Transport properties), (*Integral equations, Transport properties), (*Numerical methods and procedures, Differential equations), (*Atmosphere, Transport properties)

The report presents a new approach to the study of integral equations and linear unstable two-point boundary -value problems. The memorandum considers the problem of radiative transfer in a plane-parallel atmosphere which absorbs radiation and scatters it isotropically, there being a continuous distribution of primary internal sources of radiation. An effective numerical technique for calculating the internal intensity and the source functions is sought. A major consideration is the computer's ability to solve initial-value problems for large systems of ordinary differential equations. The authors derive new differential-integral equations for the internal intensity at a fixed point and direction, and the source function at a fixed point, the

new independent variable being the thickness of the atmosphere. Using standard quadrature techniques, they approximate these equations by systems of ordinary differential equations whose numerical treatment is straightforward. (Author)

AD-629 134 Fld. 12/1
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF MATHEMATICS
A GENERAL PERRON INTEGRAL,
by P. S. Bullen. 18 Mar 63, 17p. Contract AF-AFOSR-62-261, Proj. AF-9749, Task 974902, AFOSR 65-2607

Unclassified report

Descriptors: (*Integrals, Potential theory), (*Potential theory, Integrals), Operators (Mathematics), Measure theory, Functional analysis

AD-629 135 Fld. 12/1
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF MATHEMATICS
SOME INEQUALITIES FOR SYMMETRIC MEANS,
by P. S. Bullen. 3 Jun 63, 11p. Contract AF-AFOSR-62-261, Proj. AF-9749, Task 974902, AFOSR 65-2606

Unclassified report

Availability: Published in Pacific Journal of Mathematics v15 n1 p47-54 1965. Copies to DDC users only.

Descriptors: (*Inequalities, Statistical analysis), (*Statistical analysis, Inequalities), Measure theory

AD-629 143 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
INVERSE LIMIT SEQUENCES WITH COVERING MAPS,
by M. C. McCord. 12 Jul 63, 16p. Contract AF-AFOSR-62-20,AF-AFOSR-407-63 Proj. AF-9749, Task 974902, AFOSR 65-2609

Unclassified report

Prepared in cooperation with Georgia Univ., Athens.

Availability: Published in Transactions of the American Mathematical Society v114 n1 p197-209 Jan 1965. Copies to DDC users only.

Descriptors: (*Sequences, Mapping (Transformations)), (*Mapping (Transformations), Sequences), Algebraic topology

AD-629 176 Fld. 12/1, 20/10
CALIFORNIA UNIV SAN DIEGO DEPT OF PHYSICS
ALGEBRAIC DERIVATION OF THE PARTITION FUNCTION OF A TWO-DIMENSIONAL ISING MODEL,
by Colin J. Thompson. 2 Nov 64, 7p. Contract AF-AFOSR-610-64, Proj. AF-9761, Task 976101, AFOSR 66-0274

Unclassified report

Availability: Published in Journal of Mathematical Physics v6 n9 p1392-5 Sep 1965. Copies to DDC users only.

Descriptors: (*Combinatorial analysis, Algebra), (*Algebra, N-body problem), Quantum mechanics, Statistical mechanics, Phase studies, Fermions, Mathematical models

In the algebraic formulation of the Ising model, the partition function is expressed as the trace of a power V (M) of the transfer operator V, or equivalently, as the sum of Mth powers of the eigenvalues of V. In the derivations of Kaufman, Onsager, and more recently of Schultz, Mattis, and Lieb (SML), the transfer operator is first reduced to a more amenable form for computation and then, in principle at least, diagonalized. For the infinite lattice, only the largest eigenvalue of V is needed, and this is all Onsager and SML compute. Kaufman finds all the eigenvalues and is thus able to write down the partition function for the finite lattice. In the present work we give an alternative derivation of the SML form for V, and show how the Kaufman result can be obtained from this form without actual diagonalization. Instead of diagonalizing V, the evaluation of the trace is done directly after assigning a simple representation to V. (Author)

AD-629 256 Fld. 12/1, 13/8
CASE INST OF TECH CLEVELAND OHIO
EXACT POWER OF SOME QUICK TESTS BASED ON MOOD'S AND MASSEY'S STATISTICS,
by F. C. Leone, I. M. Chakravarti, and J. D. Alanen. 1961, 13p. Contract AF 49 (638)-361, Proj. AF-9749, Task 974902, AFOSR 65-2602

Unclassified report

Availability: Published in Bulletin de l'Institut International de Statistique 33e Session p1-11 Paris 1961. Copies to DDC users only.

Descriptors: (*Statistical tests, Optimization), (*Quality control, Statistical tests), Sampling, Population (Mathematics), Statistical distributions

The objects of the present investigation are: (i) to derive the exact power functions of Mood's and Massey's tests for two samples against parametric alternatives of exponential and rectangular populations; (ii) to tabulate them for comparable sample sizes in order to get an idea about their respective performances as well as to evaluate if there is any resultant gain in the use of Massey's test (which uses more than one fractile and hence is more elaborate) over Mood's test.

AD-629 269 Fld. 12/1
RIAS INC BALTIMORE MD
GENERALIZED RECURRENCE IN DYNAMICAL SYSTEMS,
by Joseph Auslander. 30 Jul 63, 12p. Contract AF 49 (638)-1242,DA-36-034-ORD-3514RD Proj. 9749, Task 974901, AFOSR 65-2321

Unclassified report

Prepared in cooperation with Maryland Univ., College Park.

Availability: Published in Differential Equations v3 n1 p65-74 1964. Copies to DDC users only.

Descriptors: (*Topology, Recursive functions), (*Recursive functions, Topology), Functional analysis, Differential geometry, Differential equations

In this paper, a notion of recurrence in dynamical systems is introduced which is defined using continuous real valued functions on the phase space. The basic idea is as follows: Consider the class of continuous real valued functions which are nonincreasing along every orbit; then, single out those orbits along which all such functions are constant. This set, which includes the periodic, recurrent, and non-wandering points, is called the generalized recurrent set. Its elementary properties are studied and it is shown that a single suitably chosen function reflects the 'recursive' behavior of the dynamical system. By means of prolongations, an intrinsic characterization of the generalized recurrent set is given. This depends on a purely topological result involving a closed quasi order which is apparently new and may be of independent interest. The connection of the generalized recurrent set with asymptotic and absolute stability of a compact invariant set is discussed. The condition that the dynamical system be free of generalized recurrent orbits is shown to lie between parallelizability and complete instability.

AD-629 270 Fld. 12/1
RIAS INC BALTIMORE MD
UNBOUNDED SOLUTIONS OF A SECOND-ORDER DIFFERENTIAL EQUATION WITH NON-NEGATIVE DAMPING,
by G. R. Morris. 20 Apr 64, 15p. Contract AF 49 (638)-1242,NASw-718 Proj. AF-9749, Task 974901, AFOSR 65-2323

Unclassified report

Availability: Published in Differential Equations v3 n4 p421-33 1964. Copies to DDC users only.

Descriptors: (*Differential equations, Functional analysis), (*Functional analysis, Differential equations), Theory

AD-629 272 Fld. 12/1
RIAS INC BALTIMORE MD
ON THE FLOW OUTSIDE A CLOSED INVARIANT SET; STABILITY, RELATIVE STABILITY AND SADDLE SETS,
by Taro Ura. 8 Mar 63, 48p. Contract AF 49 (638)-382,DA-36-034-ORD-3514RD Proj. AF-9749, Task 974901, AFOSR 65-2322

Unclassified report

Prepared in cooperation with Kobe Univ. (Japan).

Availability: Published in Differential Equations v3 n3 p249-94 1964. Copies to DDC users only.

Descriptors: (*Topology, Invariance), (*Invariance, Topology), Stability, Differential geometry, Set theory, Differential equations

In this paper the author studies local properties of a dynamical system, with emphasis on stability of a closed invariant set M, which is necessarily compact in our axioms explained later. In an earlier paper, assuming a closed invariant set M is isolated from closed invariant sets, he proved that M cannot be stable in both senses and that positive stability is equivalent to positive asymptotic stability. Now omitting this assumption, he researches the behavior of solutions and topological and dynamical properties of closed invariant sets in the vicinity of M. To describe this behavior and these properties, he introduces a new notion of relative stability, i.e., stability referred to the topology of a subspace of the original phase space in a modified sense. Historically, this notion has already appeared implicitly in Poincare's theory, but has never been treated systematically under general conditions, as far as the author knows.

AD-629 375 Fld. 12/1, 5/1
CFSTI Prices: HC $2.60 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
DENUMERABLE STATE MARKOVIAN DECISION PROCESSES: AVERAGE COST CRITERION.
Technical rept.,
by Cyrus Derman. 28 Feb 66, 23p. Rept. no. TR-86,
Contract Nonr-225 (53), Proj. NR-042-002,

Unclassified report

Descriptors: (*Decision theory, Optimization), (*Dynamic programming, Decision making), Costs, Statistical processes, Sequential analysis, Management engineering

Markovian decision processes with a countable number of states and average cost criterion are considered. Counterexamples are presented to show that optimal control rules need not exist or if they do exist they may not be of a deterministic stationary Markovian character. Conditions are presented under which optimal rules do exist and are stationary deterministic. Further conditions are presented under which a policy improvement procedure converges to an optimal rule. (Author)

AD-629 399 Fld. 12/1
SYRACUSE UNIV N Y DEPT OF MATHEMATICS
INVERTING NONLINEAR DIFFERENTIAL SYSTEMS WITH INITIAL CONDITIONS,
by Peter Frank. 1965, 5p. Contract DA-31-124-ARO (D)-87,
AROD 3999:4
Unclassified report

Availability: Published in Journal of Mathematical Analysis and Applications v12 n2 p301-5 Oct 1965. Copies to DDC users only.

Descriptors: (*Nonlinear differential equations, Functional analysis), (*Functional analysis, Nonlinear differential equations), Perturbation theory, Series, Approximation (Mathematics)

The perturbation method has been applied widely for approximating solutions of differential equations. In a paper by Frank and McFee, the concept of analytic function from one Banach space to another was used to justify this method when the initial conditions are zero. In this paper, convergence of an analogous method is discussed when the initial conditions are nonzero but small. This method has been used in special cases by Pipes and Cunningham, but no justification is presented. In the solution of nonlinear equations by the perturbation method, it is customary to place the initial conditions in the zeroth order (or 'generating') solution and to require that the initial conditions of higher order perturbations be zero. A rigorous justification of this procedure (which does not seem to have been given before) is given in this paper. In addition, as a consequence of a Theorem: a nonlinear functional equation whose linear part is an nth order differential operator, can be solved for small inputs (y) and small initial conditions if the same is true of the linear part; the stability of nonlinear systems is shown to be a consequence of the stability of the linear approximation.

AD-629 435 Fld. 12/1, 20/11
CFSTI Prices:MF $0.75
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
COMMUNICATIONS ON PURE AND APPLIED MATHEMATICS, VOLUME XIX, NUMBER 1, FEBRUARY, 1966.
1966, 122p.
Unclassified report

Availability: Interscience Publishers, 605 Third Ave., New York. $12.00 per year; Foreign postage $1.00.

Descriptors: (*Mathematics, Periodicals), Partial differential equations, Differential equations, Integral equations, Elasticity, Operators (Mathematics), Atomic structure, Difference equations, Boundary value problems

Contents: The cauchy problem for the coupled Maxwell and Dirac equations by Leonard Gross; Control in finite time of differential equations in Banach space by H. O. Fattorini; The tricomi problem for an equation of abruptly changing type by Lesley M. Sibner; The radon transform on Euclidean space by Donald Ludwing; Upper estimate of the potential elastic energy of a cylinder by A. Dou; Global solutions of the cauchy problem for quasi-linear first-order equations in several space variables by Edward Conway and Joel Smoller; On the continuous spectrum of Schrodinger operators by Joachim Weidmann; and Accuracy and dissipation in difference schemes by Beresford Parlett.

AD-629 446 Fld. 12/1
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
SUFFICIENT CONDITIONS FOR STABILITY AND INSTABILITY OF AUTONOMOUS FUNCTIONAL-DIFFERENTIAL EQUATIONS,
by Jack K. Hale. 1964, 32p. Contract DA-31-124-ARO (D)-270 ,AF-AFOSR-693-64
AROD 5145:3
Unclassified report

Availability: Published in Journal of Differential Equations v1 n4 p452-82 Oct 1965. Copies to DDC users only.

Descriptors: (*Functional analysis, Differential equations), (*Differential equations, Functional analysis), Time-lag theory, Invariance, Stability

AD-629 486 Fld. 12/1, 20/13
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
CONCERNING THE VALUE OF A DEFINITE INTEGRAL,
by Kanakanahalli S. Nagaraja. 30 Jul 64, 11p.
Rept. no. ARL-65-200,
Proj. AF-7064, Task 706400,
Unclassified report

Availability: Published in Journal of Mathematics and Physics v64 n2 p182-8 Jun 1965. Copies to DDC users only.

Descriptors: (*Integrals, Numerical analysis), (*Kinetic theory, Integrals), Distribution

Many problems in Kinetic theory of gases, wherein the molecules are characterized by Maxwellian velocity distribution functions, involve a variety of definite integrals. It is necessary to evaluate these integrals in order to obtain analytical or numerical solutions. The integral under study occurs in the linearized Rayleigh problem according to Kinetic theory, and its evaluation is necessary to discuss the nature of the Kernel of a singular integral equation at the singularity. The analytical results in the limit as p approaches infinity agree with those derived by Goodwin and Staton. (Author)

AD-629 506 Fld. 12/1
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
A NOTE ON SOME GRAPHS RELATED TO KNOTS,
by Thomas A. Brown. Mar 66, 8p. Rept. no. P-3320,
Unclassified report

Prepared for publication in the Journal of Combinatorial Theory.

Descriptors: (*Graphics, Topology), (*Topology, Graphics), Combinatorial analysis

AD-629 518 Fld. 12/1
CFSTI Prices: HC $1.60 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
ON THE ASYMPTOTIC BEHAVIOR OF K-MEANS,
by James B. MacQueen. Nov 65, 14p. Rept. no. WMSI Working Paper-89,
Contract Nonr-233 (75) Proj. NR-047-041,
Unclassified report

Descriptors: (*Statistical analysis, Measure theory), Stochastic processes, Convex sets, Combinatorial analysis, Decision theory, Multivariate analysis

AD-629 525 Fld. 12/1
CFSTI Prices: HC $5.60 MF $0.50
HARVARD UNIV CAMBRIDGE MASS DEPT OF STATISTICS
STOCHASTIC POINT PROCESSES: LIMIT THEOREMS.
Technical rept.,
by Jay R. Goldman. 4 Feb 66, 54p. Rept. no. TR-3,
Contract Nonr-1866 (37), Proj. NR-042-097,
Unclassified report

Descriptors: (*Stochastic processes, Theorems), (*Theorems, Stochastic processes), Measure theory

A stochastic point process in R (n) is a triple (M,B,P) where M is the class of all countable sets in R (n) having no limit points, B is the smallest sigma-algebra on M which makes the functions N sub s (x), defined by N sub s (x) = the number of points of x in S where x belongs to M and S is a Borel set in R (n), measurable, and P is a probability measure on B. A variety of operations on point processes which yield new point processes can be defined e.g. superposition, deleting points, random translations of points, and clustering of points. The sequence of processes produced by iteration of these operations on a specified point process will, under, very general conditions and for a wide class of point process including the stationary ones, converge to a mixture of Poisson processes. These results are established via a generalization of a classical limit theorem for Bernoulli trials. (Author)

AD-629 528 Fld. 12/1
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
A FINITE DIFFERENCE ANALOG OF THE NEUMANN PROBLEM FOR POISSON'S EQUATION,
Revised ed.,
by J. H. Bramble,'and B. E. Hubbard. 13 Jul 64, 17p. Contract AFOSR-62-454 ,NSF-GP-3
AFOSR 65-2352
Unclassified report

Revision of manuscript submitted 15 Nov 63.

Availability: Published in J. SIAM Numer. Anal. SerB v2 n1 p1-14 1964. Copies to DDC users only.

Descriptors: (*Boundary value problems, Partial differential equations), (*Partial differential equations, Boundary value problems), Difference equations

AD-629 529 Fld. 12/1
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA)
SYMMETRIC INTEGRATION RULES FOR HYPERCUBES. II. RULE PROJECTION AND RULE EXTENSION,
by J. N. Lyness. 8 May 64, 15p. Contract AF-AFOSR-62-400,
AFOSR 65-2950
Unclassified report

See also AD-628 522.

Availability: Published in Mathematics of Computation v19 n91 p394-407 Jul 1965. Copies to DDC users only.

Descriptors: (*Integration, Numerical methods and procedures), (*Numerical methods and procedures, Integration), Theory, Australia

The purpose of this paper is to introduce a theory of rule extension by which an s-dimensional rule of particular degree may be used to construct an r-dimensional rule of predetermined degree. This is a generalisation of the process which leads to a product rule. The particular feature of this process is that it is a linear process; once a set of nonlinear equations have been solved to obtain the s-dimensional rule, the higher-dimensional rule may be obtained by the application of linear algebraic formulae. Previously unpublished integration rules are derived.

AD-629 530 Fld. 12/1
SYDNEY UNIV (AUSTRALIA)
TRIANGULAR FACTORS OF MODIFIED MATRICES.

Revised ed.,
by John M. Bennett. 13 Oct 64, 7p. Contract AF-AFOSR-62-402, Proj. SRMA-9749, Task 974901,
AFOSR 65-2351

Unclassified report

Revision of manuscript submitted 29 May 62.

Availability: Published in Numerische Mathematik v7 p217-21 1965. Copies to DDC users only.

Descriptors: (*Matrix algebra, Theory), Algorithms, Australia

AD-629 538 Fld. 12/1
HARVARD UNIV CAMBRIDGE MASS
POLYNOMIALS OF BEST APPROXIMATION ON AN INTERVAL, II,
by J. L. Walsh, and T. S. Motzkin. 16 Jul 62, 6p. Contract AF-AFOSR-62-198,
AFOSR J27

Unclassified report

Prepared in cooperation with California Univ., Los Angeles.

Availability: Published in Proceedings of the National Academy of Sciences v48 n9 p1533-7 Sep 1962. Copies to DDC users only.

Descriptors: (*Polynomials, Approximation (Mathematics)), (*Approximation (Mathematics), Polynomials), Theorems, Functional analysis

AD-629 567 Fld. 12/1
BRITISH COLUMBIA UNIV VANCOUVER
A NEW PROOF OF AN INEQUALITY OF HEINZ,
by P. S. Bullen. 3 Jun 63, 6p. Contract AF-AFOSR-62-261,
AFOSR 65-2605

Unclassified report

Availability: Published in Canad. Math. Bull. v7 n1 p97-100 Jan 1964. Copies to DDC users only.

Descriptors: (*Inequalities, Convex sets), Theorems, Functional analysis, British Columbia

AD-629 591 Fld. 12/1
ILLINOIS UNIV URBANA
A PICARDESQUE THEOREM FOR FORMAL POWER SERIES,
by L. A. Rubel. 3 Dec 63, 5p. Contract AF-AFOSR-460-63,
AFOSR 65-2600

Unclassified report

Availability: Published in Nieuw Archief Voor Wiskunde v3 n1 pt12 p8-11 1964. Copies to DDC users only.

Descriptors: (*Theorems, Power series), (*Power series, Theorems), Complex numbers, Functions

AD-629 593 Fld. 12/1
ILLINOIS UNIV URBANA DEPT OF MATHEMATICS
BOUNDED POLYNOMIAL APPROXIMATION,
by L. A. Rubel. 4 Nov 63, 5p. Contract AF-AFOSR-460-63,
AFOSR 65-2601

Unclassified report

Availability: Published in J. SIAM Numer. Anal. Ser. B v1 p133-6 1964. Copies to DDC users only.

Descriptors: (*Polynomials, Approximation (Mathematics)), (*Approximation (Mathematics), Polynomials), Theorems, Functional analysis

AD-629 595 Fld. 12/1
IOWA STATE UNIV IOWA CITY
A MATRIX EQUATION RELATED TO A NON-OSCILLATION CRITERION AND LIAPUNOV STABILITY,
by William T. Reid. 13 May 64, 5p. Contract AF-AFOSR-438-63,
AFOSR 65-2629

Unclassified report

Availability: Published in Quarterly of Applied Mathematics v23 n1 p83-7 Apr 1965. Copies to DDC users only.

Descriptors: (*Matrix algebra, Theory), Special functions (Mathematical), Stability, Differential equations, Control

In this note it is shown that recent work of the author on Riccati matrix differential equations and non-oscillation criteria for associated linear differential systems implies a result on the solution of an algebraic matrix equation that is intimately related to the existence of a Liapunov function for linear differential systems with constant coefficients.

AD-629 597 Fld. 12/1
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
DIAGONAL PRODUCTS IN DOUBLY STOCHASTIC MATRICES,
by M. Marcus, and H. Minc. 5 Dec 63, 6p. Contract AF-AFOSR-432-63, Proj. AF-9749, Task 974901,
AFOSR 65-2341

Unclassified report

Availability: Published in The Quarterly Journal of Mathematics v16 n61 p32-4 Mar 1965. Copies to DDC users only.

Descriptors: (*Matrix algebra, Stochastic processes), (*Stochastic processes, Matrix algebra), Permutations, Combinatorial analysis

AD-629 600 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
TRANSLATION-INVARIANT CONES OF FUNCTIONS ON SEMI-SIMPLE LIE GROUPS,
by Harry Furstenberg. 20 Sep 64, 59p. Contract AF-AFOSR-381-63, Proj. AF-9749, Task 974902,
AFOSR 65-2619

Unclassified report

Availability: Published in Bulletin of the American Mathematical Society v71 n2 p271-326 Mar 1965. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), Harmonic analysis), (*Functions, Groups (Mathematics)), Invariance, Measure theory, Convex sets

AD-629 602 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
CONVERGENCE OF WEIGHTED AVERAGES OF INDEPENDENT RANDOM VARIABLES,
by Benton Jamison, Steven Orey, and William Pruitt. 26 Jun 64, 8p. Contract AF-AFOSR-381-63, Proj. AF-9749, Task 974902,
AFOSR 65-2618

Unclassified report

Availability: Published in Z. Wahrscheinlichkeitstheor ie v4 p40-4 1965. Copies to DDC users only.

Descriptors: (*Stochastic processes, Sequences), Measure theory, Distribution functions

AD-629 604 Fld. 12/1
MICHIGAN UNIV ANN ARBOR DEPT OF MATHEMATICS
GENERALIZATION OF THE CONCEPT OF CONTINUOUS FUNCTION AND HOMEOMORPHISM,
by Rubens G. Lintz. 1965, 25p. Contract AF-AFOSR-373-63,
AFOSR 65-2637

Unclassified report

Availability: Published in Annali di Matematica pura ed applicata, v67 n4 p215-34 1965. Copies to DDC users only.

Descriptors: (*Topology, Functions), (*Functions, Topology), Theory, Algebraic topology

The generalization given of the concept of a continuous function and homeomorphism seems to be useful in some questions of topology. For instance, applications are given to separation theorems and to Cech homology theory. (Author)

AD-629 605 Fld. 12/1
CFSTI Prices: HC $3.60 MF $0.50
RAND CORP SANTA MONICA CALIF
REGULAR LINE SYMMETRIC GRAPHS,
by Jon Folkman. Mar 66, 37p. Rept. no. rm-4889-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Graphics, Theory), Permutations, Groups (Mathematics)

An investigation is made of the extent to which line symmetry and regularity imply point symmetry. First, some conditions are given on the number of vertices and the degree of regularity under which line symmetry and regularity imply point symmetry; then, general methods for constructing graphs that are line symmetric, and finally, a summary of what is known about the number of vertices that a regular line symmetric graph that is not point symmetric can have. The memorandum concludes with a list of unsolved problems in this area. (Author)

AD-629 611 Fld. 12/1
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
BOWLS, F-FIBRE-BUNDLES AND THE ALTERATION OF CRITICAL VALUES,
by Marston Morse. 22 Jun 64, 18p. Contract AF-AFOSR-357-63,
AFOSR 65-2641

Unclassified report

Availability: Published in An. da Acad. Brasileira de Ciencias v36 n3 p245-59 Sep 30 1964. Copies to DDC users only.

Descriptors: (*Algebraic topology, Theory)

AD-629 617 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
NORM DECREASING HOMOMORPHISMS OF GROUP ALGEBRAS,
by Frederick P. Greenleaf. 1964, 7p. Contract AF-AFOSR-407-63, Proj. AF-9749, Task 974902,
AFOSR 65-2610

Unclassified report

Availability: Published in Bulletin of the American Mathematical Society v70 n4 p536-9 Jul 1964. Copies to DDC users only.

Descriptors: (*Algebras, Mapping (Transformations)), (*Mapping (Transformations), Algebras), Groups (Mathematics), Topology, Measure theory

AD-629 618 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
NON-ASSOCIATIVE NORMED ALGEBRAS AND HURWITZ' PROBLEM,

by Lars Ingelstam. 11 Feb 64, 11p. Contract AF-AFOSR-407-63, Proj. AF-9749, Task 974902,
AFOSR 65-2612

Unclassified report

Continuation of Grant AF-AFOSR-62-20.

Availability: Published in Arkiv For Matematik v5 n15 p231-8 1964. Copies to DDC users only.

Descriptors: (*Algebras, Indentities), (*Functional analysis, Complex numbers), Real numbers, Theorems

AD-629 619 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
ON FUNCTIONS WITH FOURIER TRANSFORMS IN L (P),
by Ron Larsen, Teng-sun Liu, and Ju-kwei Wang. 1 Jun 64, 13p. Contract AF-AFOSR-407-63,NSF-GP-1814 Proj. AF-9749, Task 974902, AFOSR 65-2613

Unclassified report

Availability: Published in Michigan Mathematical Journal v11 p369-78 1964. Copies to DDC users only.

Descriptors: (*Integral transforms, Functional analysis), (*Functional analysis, Integral transforms), Algebras, Groups (Mathematics)

AD-629 621 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
HILBERT ALGEBRAS WITH IDENTITY,
by Lars Ingelstam. 3 Jul 63, 6p. Contract AF-AFOSR-407-63, Proj. AF-9749, Task 974902, AFOSR 65-2614

Unclassified report

Bulletin of the American Mathematical Society v69 n6 p794-6 Nov 1963.

Descriptors: (*Functional analysis, Complex numbers), Algebras, Identities, Theorems

AD-629 626 Fld. 12/1
MIAMI UNIV CORAL GABLES FLA
CONVERGENCE OF COMPLEX LAGRANGE INTERPOLATION POLYNOMIALS ON THE LOCUS OF THE INTERPOLATION POINTS,
by J. H. Curtiss. 21 Nov 63, 21p. Contract AF-AFOSR-62-189 ,AF-AFOSR-358-63
AFOSR 65-2355

Unclassified report

Availability: Published in Duke Mathematical Journal v32 n2 p187-204 Jun 1965. Copies to DDC users only.

Descriptors: (*Polynomials, Approximation (Mathematics)), (*Approximation (Mathematics), Polynomials), Complex numbers

AD-629 649 Fld. 12/1, 20/11
RENSSELAER POLYTECHNIC INST TROY N Y
NEW EIGENFUNCTION EXPANSIONS AND ALTERNATIVE REPRESENTATIONS FOR THE REDUCED WAVE EQUATION,
by Donald S. Cohen. 1964, 12p. Contract AF-AFOSR-182-63,
AFOSR 65-2201

Unclassified report

Availability: Published in Journal of Mathematics and Mechanics v14 n3 p403-12 May 1965. Copies to DDC users only.

Descriptors: (*Functions, Series), (*Equations of motion, Boundary value problems), Integral transforms, Membranes, Motion

AD-629 685 Fld. 12/1, 20/9
CFSTI Prices: HC $4.60 MF $0.50
JASON DIV INST FOR DEFENSE ANALYSES ARLINGTON VA
SINGULAR SOLUTIONS OF CERTAIN INTEGRAL EQUATIONS.
Research paper,
by Kenneth M. Case. Jan 66, 46p. Rept. no. RP-P-240,IDA/HQ 66-4533
Contract SD-50,

Unclassified report

Descriptors: (*Integral equations, Approximation (Mathematics)), (*Approximation (Mathematics), Plasma physics), Green's function, Fourier analysis, Boundary value problems

A class of integral equations arising in some idealized plasma problems is discussed. While these do not have solutions in the space of square integrable functions, they do have such in an appropriate space of generalized functions. Explicit solutions are given in some special cases. It is then shown how these solutions can be used to approximate those for more general problems. (Author)

AD-629 687 Fld. 12/1
ILLINOIS UNIV URBANA
SUBFIELDS THAT ARE ALGEBRAICALLY CLOSED IN THE FIELD OF ALL MEROMORPHIC FUNCTIONS,
by S. Hellerstein, and L. A. Rubel. 22 Apr 63, 10p. Contract AF-AFOSR-460-63, NSF-G19701
AFOSR 65-2598

Unclassified report

Prepared in cooperation with Stanford Univ., Calif. and Columbia Univ., New York.

Availability: Published in Journal d'Analyse Mathematique p105-11 1965. Copies to DDC users only.

Descriptors: (*Functions, Algebra), Measure theory, Theorems

AD-629 712 Fld. 12/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
ON THE INVARIANTS OF A VECTOR SUBSPACE OF A VECTOR SPACE OVER A FIELD OF CHARACTERISTIC TWO.
Physical and mathematical sciences research papers, (Revised ed.),
by Vera Pless. 28 Sep 64, 11p. Rept. no. afcrl-PMSRP-187,AFCRL-66-46
Proj. AF-5632, Task 563202,

Unclassified report

Revision of manuscript submitted 8 Jun 64.

Availability: Published in Proceedings of the American Mathematical Society v16 p5 p1062-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Invariance, Matrix algebra), Theorems, Groups (Mathematics)

AD-628 994 See Fld. 5/10

AD-628 995 See Fld. 5/10

AD-629 114 See Fld. 3/2

AD-629 152 See Fld. 20/4

AD-629 250 See Fld. 7/4

AD-629 309 See Fld. 5/7

AD-629 327 See Fld. 9/2

AD-629 359 See Fld. 17/9

AD-629 416 See Fld. 20/4

AD-629 432 See Fld. 13/8

12/2. OPERATIONS RESEARCH

AD-628 954 Fld. 12/2
CFSTI Prices: HC $6.00 MF $1.50
OFFICE OF NAVAL RESEARCH WASHINGTON D C
INVESTIGATION OF NONLINEAR CONTROL SYSTEMS. PART 5. PIECE-WISE LINEAR METHODS AND ABSOLUTE STABILITY.
Rept. for 1 Apr 63-31 Mar 64,
by Nicholas Minorsky. Mar 64, 279p.

Unclassified report

Descriptors: (*Control systems, Nonlinear systems), (*Stability, Control systems), Linear systems, Theory, Optimization, Functional analysis, Calculus of variations

AD-628 955 Fld. 12/2, 9/4
CFSTI Prices: HC $6.00 MF $1.50
OFFICE OF NAVAL RESEARCH WASHINGTON D C
INVESTIGATION OF NONLINEAR CONTROL SYSTEMS. PART 6. EXTREMAL SYSTEMS AND INTRODUCTION OF STATISTICAL DATA.
Rept. for 1 Apr 64-31 Mar 65,
by Nicholas Minorsky. Mar 65, 272p.

Unclassified report

Partially supported by Contract N62558-2167

Descriptors: (*Control systems, Nonlinear systems), (*Optimization, Control systems, Functional analysis, Information theory, Search theory, Detection

AD-628 976 Fld. 12/2
CFSTI Prices: HC $1.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL TECHNOLOGICAL INST
A GENERALIZATION OF A THEOREM OF EDMUND EISENBERG.
Systems research memo.,
by Abraham Charnes, and Kenneth O. Kortanek.
Aug 65, 16p. Rept. no. SRM-128,
Contract Nonr-1228 (10),DA-31-124-ARO (D)-322 Proj. NR-047-021,

Unclassified report

Extension and revision of ONR Research rep 92. Prepared in cooperation with Chicago Univ. Ill.

Descriptors: (*Theorem, Nonlinear programming), (*Nonlinear programming, Theorems), Quadratic programming, Optimization

The convex duality theory as developed by Charnes -Cooper-Kortanek which is valid for non-differentiable quasi-concave functions is applied to derive a gradient inequality for a non-differentiable function involving a symmetric quadratic form with positivity required only on a given convex polyhedral cone, generalizing a theorem of Edmund Eisenberg. No assumption is needed either that the primal problem attain its extremal value since the CCK duality theory includes this possibility. The theory directly applies to the non-homogeneous problem where now the given cone is replaced by the intersection of a finite number of half spaces. (Author)

AD-629 000 Fld. 12/2
CFSTI Prices: HC $6.60 MF $0.75
CALIFORNIA UNIV BERKELEY COLL OF ENGINEERING
ON THE GEOMETRY OF OPTIMAL PROCESSES, PART III,
by A. Blaquiere, and G. Leitmann. Jan 66, 62p.
Rept. no. AM-66-1,
Contract Nonr-3656 (31)

Unclassified report

Descriptors: (*Optimization, Control systems), (*Control systems, Optimization), (*Geometry, Control systems), Boundary

value problems, Rocket trajectories, Navigation

AD-629 021 Fld. 12/2
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y RESEARCH DEPT
NECESSARY CONDITIONS FOR SINGULAR EXTREMALS.
Revised ed.,
by Richard E. Kopp, and Gardner H. Moyer. 29 Apr 65, 10p. Contract AF 49 (638)-1207, Proj. AF-9749, Task 974901,
AFOSR 65-2095

Unclassified report

Presented as Preprint 65-63 at the AIAA Aerospace Sciences Meeting (2nd), New York, 25-27 Jan 1965.

Availability: Published in AIAA Journal v3 n8 p1439-44 Aug 1965. Copies to DDC users only.

Descriptors: (*Complex variables, Optimization), Calculus of variations, Control, Rocket trajectories

The purpose of this paper is to derive a set of necessary conditions for singular arcs. In this case, the classical Weierstrass and Legendre tests as well as the maximum principle fail to determine the nature of the extremal path. In the present analysis the second variation of the function to be minimized is evaluated for explicitly defined control variations. The dominant term of a power series in tau, a parameter of the control variation which is allowed to approach zero in the limit, is calculated and examined for semidefiniteness. Should this term be zero for a particular problem, a new control variation is chosen and the procedure repeated. These control variations all belong to a special class of functions that were constructed with the satisfaction of terminal boundary conditions in mind. These boundary conditions are satisfied by applying secondary control variations that contribute terms to the second variation that are at least one degree higher in tau. The results of the analysis are applied to the specific problem of rocket flight in an inverse square law field. It is shown that, for the time open case, the singular arc (Lawden's spiral) is nonoptimal. (Author)

AD-629 129 Fld. 12/2, 15/7
CFSTI Prices: HC $3.60 MF $0.50
RAND CORP SANTA MONICA CALIF
PROCEDURES FOR COMPARING THE CORRELATED OUTPUTS OF TWO AIR FORCE BASES,
by S. James Press. Dec 65, 37p. Rept. no. RM-4665-PR,
Contract AF 49 (628)-1700,

Unclassified report

Descriptors: (*Statistical tests, Air force operations), (*Air force operations, Model theory), S-matrix, Distribution theory, Correlation techniques, Operations research

This study is concerned with statistical procedures for simultaneously comparing the outputs of two functional units; possibly the outputs of one Air Force base with those of another. The outputs at a given base are assumed to be random variables and possibly correlated. Various assumptions are made regarding the nature of the correlations among the outputs at a given base and how these correlations relate to those at another base. The statistical tests developed for measuring these outputs are likelihood ratio procedures. In addition to tests of the hypotheses, power functions for the tests are presented, so that sample sizes necessary to achieve a given power can be predetermined. Four separate models are treated, and an example utilizing Air Defense Command data is presented. Tests are also provided for deciding which model to use in any given situation. It it is found that the kinds of tests described will prove useful repeatedly, they can easily be programmed for computer utilization. Computing test statistics involves only algebraic and matric operations, and at worst, a matrix inversion. The procedures described here should help eliminate a great deal of guesswork sometimes associated with large-scale comparisons of dissimilar objects. (Author)

AD-629 271 Fld. 12/2, 9/3
RIAS INC BALTIMORE MD
SOME APPLICATIONS OF STOCHASTIC DIFFERENTIAL EQUATIONS TO OPTIMAL NONLINEAR FILTERING.
Revised ed.,
by W. M. Wonham. 3 Nov 64, 23p. Contract AF 49 (638)-1206,NASw-845 Proj. AF-9749, Task 974901,
AFOSR 65-2330

Unclassified report

Revision of manuscript submitted 30 Apr 64.

Availability: Published in J. SIAM Control, v2 n3 (SerA) p347-69 1965. Copies to DDC users only.

Descriptors: (*Filters (Electromagnetic wave), Optimization), (*Differential equations, Filters (Electromagnetic wave)), Analog systems, Control systems, Nonlinear systems, Perturbation theory, Stochastic processes

AD-629 308 Fld. 12/2, 5/1
CFSTI Prices: HC $3.60 MF $0.50
STANFORD UNIV CALIF DEPT OF STATISTICS
FINITE QUEUES IN SERIES WITH EXPONENTIAL OR ERLANG SERVICE TIMES.
Technical rept.,
by Frederick S. Hillier, and Ronald W. Boling. 18 Mar 66, 36p. Rept. no. TR-88,TR-1 Contract Nonr-225 (53),Nonr-225 (89) Proj. NR-042-002 ,NR-047-061

Unclassified report

Descriptors: (*Queueing theory, Optimization), Operations research, Quality control, Production control, Approximation (Mathematics), Probability

This paper considers a queueing system consisting of N service channels in series where each channel has an exponential or Erlang holding time and (except for the first channel) a finite queue, and where the input process is such that the first queue is never empty. The measures considered are the steady-state mean output rate and mean number of customers in the system (excluding the first queue). First, a procedure is described for obtaining these measures which is relatively efficient computationally. Second, an exceptionally efficient procedure is developed for approximating the mean output rate for the case of exponential holding times. It is demonstrated that this procedure provides an excellent approximation for most cases and that it is computationally feasible for large problems. Third, extensive new numerical results are obtained. (Author)

AD-629 384 Fld. 12/2
CFSTI Prices: HC $3.60 MF $0.50
RESEARCH ANALYSIS CORP MCLEAN VA
PROPERTIES OF A GENERALIZED INVERSE WITH APPLICATIONS TO LINEAR PROGRAMMING THEORY.
Technical paper,
by Abraham Charnes, and Michael J. L. Kirby. Aug 65, 31p. Rept. no. RAC-TP-171, Contract DA-44-188-ARO-1,

Unclassified report

Descriptors: (*Linear programming, Matrix algebra), (*Matrix algebra, Linear programming), Algorithms, Optimization, Theory

In the first five sections of this paper various properties of a Rao generalized inverse of a matrix are established. A method of computing such an inverse is also given. In order to illustrate the differences between the Rao and other generalized inverses, a survey of results on Penrose-Moore inverses is included. The last three sections are devoted to showing how a generalized inverse can be used in the theoretical development of the simplex and modified simplex methods of linear programming. In particular, it is shown that the fundamental equations and iteration formulas of these methods can be derived using matrix notation without requiring the assumption that the linear programming problem has no redundant constraints. (Author)

AD-629 487 Fld. 12/2
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
ON DIRECT SUMS AND TENSOR PRODUCTS OF LINEAR PROGRAMS,
by Arno Jaeger, and Bertram Mond. 15 Aug 63, 17p. Rept. no. ARL-65-220,
Proj. AF-7071, Task 707100,

Unclassified report

Prepared in cooperation with Cincinnati Univ., Ohio.

Availability: Published in Z. Wahrscheinlichkeitstheor ie v3 p19-31 1964. Copies to DDC users only.

Descriptors: (*Game theory, Matrix algebra), (*Matrix algebra, Linear programming), (*Linear programming, Tensor analysis), Combinatorial analysis, Vector analysis

A direct sum and tensor product of linear programs are defined. Conditions are obtained for the solution of the direct sum or tensor product program to be determined from the solutions of the component games. (Author)

AD-629 505 Fld. 12/2
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
FINDING EVERETT'S LAGRANGE MULTIPLIERS BY LINEAR PROGRAMMING,
by R. Brooks, and A. Geoffrion. 25 Feb 66, 9p. Rept. no. P-3315,

Unclassified report

Prepared for submission to Operations Research as a letter to the Editor.

Descriptors: (*Linear programming, Calculus of variations), (*Numerical analysis, Partial differential equations), Optimization

AD-629 519 Fld. 12/2
CFSTI Prices: HC $3.60 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
ON SOLVING BI-CRITERION MATHEMATICAL PROGRAMS,
by Arthur M. Geoffrion. Dec 65, 38p. Rept. no. WMSI Working Paper-92,
Contract Nonr-233 (75) Proj. NR-047-041,

Unclassified report

Descriptors: (*Mathematical programing, Algorithms), (*Algorithms, Mathematical programming), Numerical analysis

It is shown that bi-criterion mathematical programs can be solved numerically by using parametric programming algorithms. Six algorithms are presented to illustrate the efficiency of the approach.

AD-629 520 Fld. 12/2, 5/10
CFSTI Prices: HC $2.60 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
COHERENT BIDDING STRATEGIES AND COMPETITIVE BEHAVIOR,
by Donald H. Woods. Jan 66, 30p. Rept. no. WMSI Working Paper-94,
Contract Nonr-233 (75) Proj. NR-047-041,

Unclassified report

Descriptors: (*Game theory, Decision making), (*Decision making, Game theory), Probability, Decision theory

A competitive sealed bidding decision game is modeled after an asymmetrically uncertain actual situation. One player knows an asset value for certain, but the other has only a probability distribution on which to act. In addition, both are uncertain regarding each other's bidding strategy. The theory of noncooperative two-person nonzero sum games, although useful in providing a structure for the problem, is not helpful because one player's bidding strategy is dependent on the true asset value whereas the other's is not. On the other hand, Bayesian decision theory provides a systematic framework for synthesizing a coherent bidding strategy even when the opponent does not play his 'equilibrium strategy.' A strategy is termed coherent when the three elements of uncertain asset value uncertain competitive behavior, and one's own bid are in balance. The subjects are a group of businessmen attending a seminar. Through the use of assessed subjective probabilities, each player's actual judgments regarding competitive behavior are taken into account. The bids are found to be largely incoherent and exploitable, although improvement is noted after switching of roles. (Author)

AD-629 521 Fld. 12/2, 5/3
CFSTI Prices: HC $3.60 MF $0.50
WESTERN MANAGEMENT SCIENCE INST UNIV OF CALIFORNIA LOS ANGELES
SOME RECTANGULAR GAMES WITH A TWO-MAN TEAM,
by James R. Jackson. Feb 66, 37p. Rept. no. WMSI Working Paper-95,
Contract Nonr-233 (73) Proj. NR-047-003,
Unclassified report

Descriptors: (*Game theory, Economics), Matrix algebra, Optimization

Certain zero-sum games are examined in which an individual player is opposed by a two-man team, whose members have identical interests, but must act separately during play. Most of the paper is devoted to instances in which one teammate has an opportunity to communicate to the other about their mutual opponent's strategy; but he may only be able to transmit a limited amount of information and his choice of a 'message' may affect the payoff. The team must thus make economically efficient use of a limited communication opportunity. The present paper treats a variety of models, all of which are formulated as rectangular (matrix) games. A subsequent paper will focus on models which cannot be so formulated either because of restrictions on the team's opportunities to use mixed strategies or because they are non-zero-sum games. (Author)

AD-629 002 See Fld. 18/8

AD-629 057 See Fld. 9/3

AD-629 082 See Fld. 14/1

AD-629 229 See Fld. 5/1

AD-629 230 See Fld. 5/1

AD-629 351 See Fld. 15/7

AD-629 381 See Fld. 14/4

AD-629 628 See Fld. 8/2

AD-629 691 See Fld. 9/3

Field 13-MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13/1. AIR CONDITIONING, HEATING, LIGHTING, AND VENTILATING

AD-629 633 Fld. 13/1, 15/3, 13/13
CFSTI Prices: HC $4.00 MF $0.75
GENERAL AMERICAN RESEARCH DIV GENERAL AMERICAN TRANSPORTATION CORP NILES ILL
SHELTER PACKAGE VENTILATION KIT.
Final rept.,
by Basil A. Libovicz, and Herman F. Behls. Oct 65, 111p. Rept. no. GARD-1244,
Contract OCD-PS-64-22, Proj. 1423A,
Unclassified report

Descriptors: (*Fallout shelters, Ventilation), (*Ventilation, Fallout shelters), Portable, Ventilation fans, Ventilation ducts, Plastics, Civil defense system, Mechanical drawings, Performance (Engineering)

A portable ventilation system that can be driven manually or by an electric motor was developed for use in Civil Defense fallout shelters. This Package Ventilation Kit includes a Fan Assembly and Drive Modules which can be assembled and operated by untrained personnel. (Author)

AD-629 634 Fld. 13/1, 13/13, 15/3
CFSTI Prices: HC $1.00 MF $0.50
GENERAL AMERICAN RESEARCH DIV GENERAL AMERICAN TRANSPORTATION CORP NILES ILL
SHELTER PACKAGE VENTILATION KIT.
Summary research rept.
Oct 65, 18p. Rept. no. GARD-1244,
Contract OCD-PS-64-22,
Unclassified report

See also AD-629 633.

Descriptors: (*Fallout shelters, Ventilation), (*Ventilation, Fallout shelters), Portable, Performance (Engineering), Packaging, Ventilation fans, Drives, Ventilation ducts, Plastic, Design, Mechanical drawings, Civil defense systems, Costs

Certain fallout shelters in the United States require ventilation systems capable of supplying from 5 to about 30 cubic feet per minute of outside air per person sheltered in order to achieve a high confidence of maintaining tolerable conditions of temperature and humidity during hot weather. The goals of this development program are portability, low cost, manual and electric drive, ease and universality of application. The resulting Package Ventilation Kit (PVK) is a complete packaged mechanical ventilation system that is portable, can be assembled and deployed by untrained personnel, and can be driven either electrically or by human power. The PVK consists of two basis packages – a Fan Assembly and Drive Module.

13/2. CIVIL ENGINEERING

AD-628 902 Fld. 13/2, 1/5
CFSTI Prices: HC $20.30 MF $1.25
OHIO RIVER DIV LABS CINCINNATI
LOCKBOURNE NO. 2. 300,000 POUND EXPERIMENTAL MAT. REPORT OF CONSTRUCTION.
Jun 45, 207p.
Unclassified report

Descriptors: (*Landing fields, Pavements), (*Pavements, Construction), (*Runways, Test facilities), Foundations (Structures), Substrates, Soil mechanics, Concrete, Reinforced concrete, Reinforcing materials, Steel, Joints

The purpose of this report is two-fold; first, to provide a record of construction methods and adaptations of standard equipment employed in building heavy duty concrete pavements ranging from 12 to 24 inches in thickness with appropriate load transfer devices and unprecedented weights and distribution of reinforcing; second, to provide a record of the design features, of the physical properties of the construction materials as concrete, base course, etc. and of the subgrade and foundations. (Author)

AD-628 983 See Fld. 8/7

AD-628 996 See Fld. 13/13

AD-629 622 See Fld. 6/11

AD-629 675 See Fld. 8/12

13/4. CONTAINERS AND PACKAGING

AD-629 275 Fld. 13/4, 20/4
CFSTI Prices: HC $1.60 MF $0.50
ARMY BALLISTIC MISSILE AGENCY REDSTONE ARSENAL ALA
DAMPED OSCILLATIONS IN A CONNECTED FLUID SYSTEM,
by Helmut F. Bauer. 1 May 59, 19p. Rept. no. ABMA-DA-TM-57-59,
Unclassified report

Descriptors: (*Fuel systems, Design), (*Sloshing, Fuel systems), Oscillation, Equations of motion, Perturbation theory, Nonlinear differential equations

Damped fluid oscillations in a system consisting of two tanks with different diameter connected with a pipeline are treated. The equations for the oscillation of the fluid system were derived from the energy equation for instationary flow and the continuity equation for incompressible fluid. The energy losses due to friction in the tanks are negligible compared with those in the pipeline due to the difference in their diameters. Furthermore a smooth inlet (outlet) was assumed in order to neglect these energy losses, too. The arising differential equations are nonlinear and were solved by a perturbation method. The results show that the damped natural frequency differs hardly from the undamped natural frequency and that the logarithmic decrement is small and decreasing with flight time. However, the flow in the pipeline is probably turbulent and with inclusion of the friction terms neglected in the analysis the damping will be higher than the calculated one. (Author)

AD-628 981 See Fld. 13/13

AD-629 285 See Fld. 20/4

13/5. COUPLINGS, FASTENERS, AND JOINTS

AD-629 509 Fld. 13/5, 13/10
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
JOINTS USED IN PLASTIC AND COMPOSITE SHIPBOARD SUPERSTRUCTURES, DECKHOUSES, LIGHT BULKHEADS, AND ENCLOSURES,
by B. F. Prokhorov. 1966, 19p. Rept. no. translation-2074-b,
TT 66-60737
Unclassified report

Soedineniya, Primenyaemye v Plastmassovykh i Kompozitnykh Konstruktsiyakh Sudovykh Nadstroek, Rubok, Legkikh Pereborok, trans. of Sudostroenie (USSR) n9 p44-51 1965.

Descriptors: (*Joints, Ship structural components), (*Ship structural components, Joining), USSR, Plastics, Composite materials, Bulkheads, Adhesives, Bonded joints, Riveted joints, Mechanical fasteners

The joints used in plastic and composite superstructures, deckhouses, bulkheads and enclosures

can be glued or fastened (bolts, screws, rivets) or they can be a combination of the two. A certain amount of caution should, however, be observed in using mechanical joints because of the well-known, negative aspects of this method, and because of the characteristics of plastics. Foremost among the latter is the great sensitivity of plastic to notching and to impact (when riveted), and also susceptibility to creep.

AD-629 439 See Fld. 11/7

13/6. GROUND TRANSPORTATION EQUIPMENT

AD-629 522 Fld. 13/6, 8/13
CFSTI Prices: MF $1.00
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
TRAFFICABILITY TESTS ON CONFINED ORGANIC TERRAIN (MUSKEG). SUMMER 1962 TESTS.
Rept. no. 2, vol. 1,
by E. S. Rush, B. G. Schreiner, and N. W. Radforth. Dec 65, 136p. Rept. no. TR-3-656-Vol-1, Proj. 1-V-O-21701-A-046, Task 1-V-O-21701-A-046-02,
Unclassified report

Availability: U. S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. HC $1.50.

Descriptors: (*Swamps, Trafficability), (*Trafficability, Swamps), (*Tracked vehicles, Mobility), Ontario, Test facilities, Terrain, Organic materials, Army equipment, Performance (engineering)

A program of trafficability tests with 10 tracked vehicles was conducted in nine confined muskeg areas in Ontario, Canada. One hundred and forty-one single self-propelled tests, 8 towing tests, 5 towed-vehicle tests, and 12 torque-requirement tests were conducted. Results showed that vehicle performance on a self -propelled (go-no go) basis can be correlated reasonably well with cone index of muskeg. Vehicle weight appears to be the most significant vehicle factor affecting performance. Vehicles weighing less than 6000 lb could travel without difficulty on all consolidated muskeg areas but had varying degrees of difficulty on floating mats. Heavier vehicles weighing up to 33,000 lb could travel on some consolidated muskeg areas but not on others. Maximum drawbar pulls with the M29C Weasel were approximately 94% of vehicle weight on consolidated muskeg and approximately 73% for the first few passes on floating mat muskeg. Cone index values in the various muskeg surface cover formulas varied widely, being influenced principally by the quantity of water present. The data obtained did not reveal even a general relation between muskeg surface cover formula and cone index. (Author)

13/7. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-629 055 Fld. 13/7, 9/2
CFSTI Prices: HC $3.00 MF $0.75
JOHNSON SERVICE CO MILWAUKEE WIS
LOW PRESSURE SIGNAL SENSOR AMPLIFIER AND ANALOG COMPUTER USING THE IMPACT MODULATOR AS THE BASIC ACTIVE PURE FLUID DEVICE. PART I. ANALOG COMPUTER.
Final rept., 1 Oct 64-30 Sep 65,
by Thomas J. Lechner. 1 Dec 65, 80p. Contract DA-49-186-AMC-126 (D)
Unclassified report

Descriptors: (*Fluid amplifiers, Analog computers), (*Analog computers, Fluid amplifiers), Integrators (Computers), Gain, Computer logic, Differential equations, Damping, Errors

Fluidic operational amplifiers and integrators have been designed and tested. The amplifier gains and integrator rate gains are shown to depend only upon the passive circuitry. First and second order linear differential equations with constant coefficients have been solved with these computing devices. Deviations between the computed and calculated first order solutions were less than 2%. Second order equations with damping greater than 0.8 also showed errors of 2% or less. Damping less than 0.8 but greater than 0.4 had less than 5% error, and lighter damped systems, including zero damping, showed errors of 8% or less. Suggestions have been made for system accuracy improvement, and also for extensions in the state of the art for fluidic computing systems. (Author)

AD-629 056 Fld. 13/7
CFSTI Prices: HC $1.00 MF $0.50
JOHNSON SERVICE CO MILWAUKEE WIS
LOW PRESSURE SIGNAL SENSOR AMPLIFIER AND ANALOG COMPUTER USING THE IMPACT MODULATOR AS THE BASIC ACTIVE PURE FLUID DEVICE. PART II. LOW PRESSURE SIGNAL SENSOR AMPLIFIER.
Final rept., 1 Oct 64-30 Sep 65,
by Thomas J. Lechner. 15 Dec 65, 8p. Contract DA-49-186-AMC-126 (D),
Unclassified report

Descriptors: (*Fluid amplifiers, Design), Fluid dynamic properties, Vortices, Pneumatic devices, Gyroscopes, Noise, Performance (Engineering), Digital systems, Deflection, Analog computers

The purpose of the investigation was to design an amplifier capable of sensing the output of a vortex rate sensor. The differential output of this rate sensor has two serious limitations; first the differential output change is small per degree of rate change, and second the sensor has a very high output impedance. An amplifier was constructed and bench tested with the sensor where feasibility was shown. The amplifier had high input impedance and sufficient gain but due to the small signal changes, the signal to noise ratio was poor. This work did point out the importance of proper impedance matching in fluidic devices, and suggested a new design concept for the amplifier. (Author)

13/8. INDUSTRIAL PROCESSES

AD-628 979 Fld. 13/8, 11/6
CFSTI Prices: HC $2.00 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C STRUCTURAL MECHANICS LAB
EFFECTS OF TEMPERING ABOVE THE LOWER CRITICAL TEMPERATURE A SUB C1 ON THE PROPERTIES OF AN HY-80 STEEL.
Progress rept. no. 6,
by Abner R. Wilner, and Marcel L. Salive. Jan 66, 29p. Proj. S-R001-01-01, Task 0401, DTMB 2140
Unclassified report

Descriptors: (*Steel, Tempering), Mechanical properties, Temperatures, Microstructure, Notch toughness, Metal plates, Transition temperature, Quenching (Cooling), Tensile properties, Welds, Fracture (Mechanics), Metallography, Transformations

The effects of tempering above the critical transformation temperature on the microstructure, notch-toughness and mechanical properties of HY-80 steel was investigated. The formation of alpha ferrite and prime martensite after tempering above the lower critical temperature and quenching will result in mechanical properties that fall below the requirements of the HY-80 specification. Retempering to achieve minimum yield strengths may result in nonuniform yield strength distribution. The possibility of underbead cracking due to alloy segregation is also discussed. (Author)

AD-628 992 Fld. 13/8, 11/6, 11/3
CFSTI Prices: HC $1.60 MF $0.50
WATERTOWN ARSENAL LABS MASS
METALLURGICAL ADVISORY COMMITTEE ON TITANIUM. SUMMARY OF ROUND TABLE MEETING ON SURACE TREATMENT OF TITANIUM.
20 May 52, 18p. Rept. no. WAL-952/4,
Unclassified report

Descriptors: (*Titanium, Symposia), Surface properties, Processing, Coatings, Metallurgy, Hardening, Vapor plating, Electrodisposition, Case hardening, Ware resistance, Friction

The following topics were discussed at the meeting: Carburizing and Induction Hardening, Nitriding, Surface Hardening with Metalloid Elements, Siliconizing, Vapordeposited Coatings, Chemical Surface Treatment, Electrodeposited Coatings and Wear and Friction Studies.

AD-629 015 Fld. 13/8
CFSTI Prices: HC $4.60 MF $0.50
TOUR (SAM) AND CO INC NEW YORK
NITRIDING AND CARBONITRIDING OF TITANIUM METAL AND ITS ALLOYS.
Final technical rept.,
by Edmond J. Silk. 12 May 52, 44p. Contract DA-30-069-ORD-216, Proj. TB4-15, WAL 401/49-9
Unclassified report

Descriptors: (*Case hardening, Titanium), (*Titanium, Case hardening), (*Titanium alloys, Case hardening), Controlled atmospheres, Ammonia, Temperature, Time, Nitrogen, Hardness, Surface properties

The equipment used for nitriding experiments on titanium and its alloys is described. The results of experiments on RC-55 ductile titanium and several higher strength alloys are described. Treating titanium and its alloys in an ammonia atmosphere produces a hard and adherent case. The minimum temperature at which surface hardening of any appreciable magnitude occurs is 1600F and the optimum minimum time of treatment appears to be 16 hours. Comparative tests with tank nitrogen indicates similar results can be obtained, but at a minimum temperature of 1800F. Commercially pure ductile titanium RC-55 suffers a loss in hardness if the time of treatment is extended beyond 16 hours, whereas the higher strength alloys do not lose hardness. (Author)

AD-629 432 Fld. 13/8, 12/1
CFSTI Prices: HC $1.60 MF $0.50
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J STATISTICS CENTER
CHAIN SAMPLING INSPECTION PLANS-CHSP-0,4 AND CHSP-1,4.
Technical rept.,
by K. S. Stephens, and H. F. Dodge. Feb 66, 17p. Rept. no. TR-N-24,
Contract Nonr-404 (18), Proj. NR-42-241 ,RR-003-05-01
Unclassified report

See also AD-625 886.

Descriptors: (*Quality control, Statistical analysis), (*Statistical analysis, Quality control), (*Sampling, Quality control), Acceptability, Operations research, Probability

This report extends the evaluation and presentation of the statistical properties of 'two-stage' chain sampling inspection plans to pairs of acceptance numbers of 0, 4 and 1, 4; plans with acceptance numbers of 0, 3; 1, 3; 0, 2; 1, 2; and 0, 1 are covered in earlier reports. Included are a number of Markov Chains used in the evaluation of the operating characteristics. OC curves for sample sizes, n = 10, 20, 50 and 100, are presented and discussed. (Author)

AD-629 706 Fld. 13/8
CFSTI Prices: HC $2.60 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
SILICON MONOXIDE BAFFLED BOX EVAPORATION SOURCE CAPABILITY.
Technical rept.,
by C. M. Ault. 30 Nov 65, 27p. Rept. no. NAFI-TR-687,
Proj. 5-0251-1, Task 4,
Unclassified report

Descriptors: (*Films, Deposition), (*Vapor plating, Evaporation), Calibration, Corrections, Silicon compounds, Monoxides, Manufacturing methods, Semiconducting films, Vacuum apparatus

The report outlines the characteristics of operation, control and film distribution attainable with a Baffled Box type SiO evaporation source in the In-Line Thin Film deposition machine. (Author)

AD-629 708 Fld. 13/8, 11/6
CFSTI Prices: HC $1.00 MF $0.50
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS TECHNOLOGY DIV
PHYSICAL AND MECHANICAL PROPERTIES OF TI-6A1-4V ALLOY SUBSEQUENT TO HIGH VELOCITY DEFORMATION.
Technical rept.,
by Roger A. Gagne. Nov 65, 23p. Proj. DA-59332007,
AMRA TR-65-29
Unclassified report

Descriptors: (*Titanium alloys, Explosive forming), (*Explosive forming, Titanium alloys), Aluminum alloys, Vanadium alloys, Mechanical properties, Deformation, Impact tests, Tensile properties, Microstructure, Ductility, Forging, Heat treatment

Titanium 6A1-4V alloy was forged from cylindrical billets into cup-shape specimens at high rates of deformation within a temperature range of 1650 F to1850 F. Tensile and impact tests as well as microstructural examinations were conducted on material in both the as-forged and as-forged-plus-heat treated conditions. (Author)

AD-628 990 **See Fld. 9/1**

AD-629 170 **See Fld. 20/5**

AD-629 178 **See Fld. 9/1**

AD-629 199 **See Fld. 9/1**

AD-629 229 **See Fld. 5/1**

AD-629 256 **See Fld. 12/1**

AD-629 274 **See Fld. 9/1**

AD-629 286 **See Fld. 9/1**

AD-629 287 **See Fld. 9/1**

AD-629 307 **See Fld. 11/2**

AD-629 385 **See Fld. 9/1**

AD-629 413 **See Fld. 11/4**

AD-629 434 **See Fld. 9/1**

AD-629 650 **See Fld. 13/11**

AD-629 717 **See Fld. 9/1**

AD-629 718 **See Fld. 9/1**

AD-629 733 **See Fld. 11/9**

13/9. MACHINERY AND TOOLS

AD-628 937 Fld. 13/9, 1/3
CFSTI Prices: HC $2.00 MF $0.50
BATTELLE MEMORIAL INST COLUMBUS OHIO
A STUDY OF SLEEVE BEARINGS IN AIRCRAFT SUPPORT STRUCTURES.
Summary rept.,
by W. A. Glaeser, M. F. Amateau, and C. M. Allen. Feb 66, 47p. Contract NOw-62-0432-c.
Unclassified report

Descriptors: (*Airframe bearings, Journal bearing), Stainless steel, Tool steel, Halocarbon plastics, Glass textiles, Cotton textiles, Reinforcing materials, Performance (Engineering), Environmental tests, Wear resistance, Friction

A research program was conducted to develop design information and data for plain airframe bearings. The type of information developed in this program included bearing life, load-carrying ability, frictional characteristics, and bearing wear rates. Emphasis was placed on grease-lubricated, high-strength steel bearings and self-lubricating Teflon-fabric bearings. Prior to the experimental work, a survey was made of airframe manufacturers to determine the present and future needs for plain-bearing design information. Based on the results of the survey, bearing materials were selected and their operating characteristics measured in an airframe-bearing-evaluation apparatus.

AD-629 038 Fld. 13/9
CFSTI Prices: HC $2.00 MF $0.50
MECHANICAL TECHNOLOGY INC LATHAM N Y
DISTORTION OF GAS THRUST BEARING DUE TO VISCOUS SHEAR.
Technical rept.,
by C. H. T. Pan, and B. Sternlicht. Dec 65, 29p.
Rept. no. mti-65TR49,
Contract Nonr-3730 (00) Proj. NR-061-131,
Unclassified report

Descriptors: (*Gas bearings, Deformation), (*Thrust bearings, Deformation), Friction, Heating, Loading (Mechanics), Thermal expansion, Thermal conductivity, Wear resistance, Coatings

Friction heat generated in the fluid film can distort the thrust surface and cause considerable reduction in load carrying capacity. In order to minimize the frictional power losses the bearing distortion must be minimized. The degree of distortion does not directly depend on the temperature level. The amount of distortion is enhanced by a large coefficient of thermal expansion and is reduced by a large coefficient of thermal conductivity. Large radius ratio bearings and/or high speed rotors are more sensitive to this type of thermal distortion. Analysis of a typical bearing design shows that the effects of thermal distortion can be significant for most structural materials. Materials for minimum thermal distortion are often not satisfactory with respect to structural considerations and from the standpoint of friction and wear. Application of surface coatings can alleviate the problem of friction and wear and permit the use of materials chosen for minimum thermal distortion. (Author)

AD-629 636 Fld. 13/9
CFSTI Prices: HC $6.00 MF $1.50
KAMAN AIRCRAFT CORP BLOOMFIELD CONN
A STUDY OF THE KAMAN DYNAMIC ANTIRESONANT VIBRATION ISOLATOR.
Final technical rept.,
by Roland C. Anderson, and Michael F. Smith.
Jan 66, 276p. Rept. no. Kaman R-574,
Contract DA-44-177-AMC-196 (T), Task DA-1P125901A14229,
USAAVLABS TR-65-75
Unclassified report

Descriptors: (*Vibration isolators, Effectiveness), Shock (Mechanics), Analysis, Wave transmission, Drop testing, Aircraft equipment

The report is the result of a research study conducted on the Dynamic Antiresonant Vibration Isolator (DAVI). Theoretical analysis and experimental model correlation show the DAVI to be capable of over 98 percent isolation at very low frequencies with low static deflections; and at a tuned frequency, the transmissibility is independent of the isolated mass. Analysis and drop tests show that the DAVI gives better shock transmissibility for its fundamental mode than a conventional isolation system with the same spring rate. (Author)

AD-629 039 **See Fld. 11/8**

AD-629 413 **See Fld. 11/4**

AD-629 674 **See Fld. 11/8**

13/10. MARINE ENGINEERING

AD-629 167 Fld. 13/10
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
AN ALL WEATHER RESCUE LAUNCH,
by D. A. Chernoguz. 1966, 3p. Rept. no. Translation-2074-a,
TT 66-60697
Unclassified report

Vsepogodnyi Spastelnyi Kater, trans. of Sudostroenie (USSR) n9 p61-2 1965.

Descriptors: (*Boats, Sea rescue equipment), (*Sea rescue equipment, Boats), Glass textiles, Crash rescue boats, Design, Construction, USSR

AD-629 273 Fld. 13/10
CFSTI Prices: HC $3.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C ACOUSTICS AND VIBRATION LAB
LONGITUDINAL VIBRATION OF PROPULSION SYSTEM ON USS SIMON LAKE (AS-33).
Final rept.,
by Gary P. Antonides. Jan 66, 33p. Proj. S-F013-11-08, Task 01351,
DTMB 2147
Unclassified report

Descriptors: (*Tenders (Vessels), Propulsion), (*Marine propulsion, Vibration), (*Propellers (Marine), Shafts), Marine engineering

Measurements were made on the propulsion system of the USS SIMON LAKE (AS-33) in February 1965 as part of a program to improve analysis procedures used by the Navy for predicting the longitudinal vibration of shaft propulsion systems. The objectives were to find the axial exciting forces and damping associated with the propulsion system of this ship, as well as to determine how the gear case, turbines, condenser, and machinery foundation affect longitudinal vibration. Alternating thrust in the shaft and longitudinal displacement of the gear case, low-pressure turbine, condenser, and machinery foundation were measured. A resonance was found to exist in the operating range, but it is not considered detrimental. The gear case, turbines, and condenser move essentially as one unit. A mass-elastic system derived from measured data includes a level effect acting on the foundation mass. The exciting forces are lower than usual, except at or near full power. (Author)

AD-629 510 Fld. 13/10, 11/2
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
THE PROSPECTS FOR USING SAND CONCRETES FOR BUILDING REINFORCED CON-

CRETE SHIPS, ARMORED CEMENT SHIPS, AND ONE-PIECE INTERSECTIONAL JOINTS,
by V. A. Mishutin. 1965, 14p. Rept. no. Translation-2074-c,
TT 66-60738

Unclassified report

Perspektivy Primeniya Peschanykh Betonov dlya Stroitel-stva Zhelezobetonnykh Sudov, Sudov iz Armotsementa i Omonolichivaniya Mezhsektsionnykh Soedinenii, trans. of Sudostroenie (USSR) n9 p51-6 1965.

Descriptors: (*Ships, Reinforced concrete), (*Reinforced concrete, Ship structural parts), Sand, USSR, Ship hulls, Joints, Compressive properties, Environmental tests, Sea water, Tensile properties, Elasticity, creep, Loading (Mechanics), Aging (Materials)

The extensive research carried out on the physical and mechanical properties of types '300', '400', and '500' sand concrete mixed in plastic mixtures and with existing dockyard technology clearly demonstrates that sand concrete possesses the characteristics of shipbuilding concrete and constitutes a prospective construction material for armocement and reinforced-concrete ships and for monolithing intersectional hull joints in reinforced-concrete ships. Sand concrete changes its physical and mechanical properties depending on its curing age, as compared to the properties of the concrete at the age of 28 days, which are essential to consider in design and building reinforced-concrete and armocement ships. Only through proper curing of the concrete, particularly during the first 7-14 days, will a high-strength, durable sand concrete be obtained. (Author)

AD-629 592 Fld. 13/10
CFSTI Prices: HC $3.60 MF $0.50
WOODS HOLE OCEANOGRAPHIC INSTITUTION MASS
OBSERVATION WINDOWS OF THE DEEP SUBMERSIBLE, ALVIN.
Technical rept.,
by James W. Mavor Jr.. Dec 65, 32p. Rept. no. Ref-65-62,
Contract Nonr-3484 (00), Proj. NR-260-107,

Unclassified report

Descriptors: (*Oceanographic vessels, Structural parts), (*Submarines, Structural parts), Design, Deep submergence, Acrylic resins, Hulls (Marine), Elasticity

The basis of the design of the ALVIN plexiglas windows is presented. The results of several tests of plexiglas windows are presented and discussed. It is concluded that the lapping of windows into their seats is unnecessary and that close fit is also not required. The ALVIN windows are conservative in design for an operating depth of 6000 feet. The use of a test window seat which does not simulate the hull strains is satisfactory for window test. It is recommended that the conical window seat be extended inward beyond the window to allow for normal elastic extrusion. Plexiglas windows are susceptible to collision damage due to brittleness and low strength of the material. An external rubber gasket was required to prevent low pressure leakage. (Author)

AD-629 673 Fld. 13/10
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
FUNDAMENTALS OF SUBMARINE THEORY,
by N. N. Efimev. 1966, 24p. Rept. no. translation-2069,
TT 66-60745

Unclassified report

Trans. of mono. Osnovy Teorii Podvodnykh Lodok, Moscow, 1965 p15-21, 62-4, 187-9; 142-5, 218-20, 265-7, 281-2, 361-5.

Descriptors: (*Submarines, Theory), Depth indicators, Depth + roll recorders, USSR, Velocity

AD-629 735 Fld. 13/10
CFSTI Prices: HC $3.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
SUPERCAVITATING PROPELLER THEORY. PART I. THE DERIVATION OF INDUCED VELOCITY EQUATIONS AND FORMULATION OF AN INITIAL DESIGN PROCEDURE.
Progress rept.,
by Geoffrey G. Cox. Feb 66, 31p. Proj. S-R009-0101, Task 0103,
DTMB 2166

Unclassified report

Descriptors: (*Propellers (Marine), Design), (*Cavitation, Propellers (Marine)), Lift, Velocity, Equations, Loading (Mechanics), Distribution, Pressure, Vortices

Induced velocity equations are presented for supercavitating propellers along with a pressure equation. Blade loading is represented by a pressure doublet distribution and the blade cavity by a pressure source distribution. Subsequently, the pressure doublet distribution is transposed to the more familiar bound and free vorticity distribution. Lifting surface equations are presented for the case of induced advance ratio as a function of radius but attention is focused on the case of constant induced advance ratio. A simplified model is proposed where loading is considered to be concentrated along a line, i.e., the lifting line. For the case of constant induced advance ratio, an initial design procedure is formulated which incorporates the simplified model. (Author)

AD-628 978 **See Fld. 13/13**

AD-628 991 **See Fld. 17/8**

AD-629 006 **See Fld. 10/2**

AD-629 509 **See Fld. 13/5**

AD-629 731 **See Fld. 11/3**

13/10.1 SUBMARINE ENGINEERING

AD-628 981 **See Fld. 13/13**

13/11. PUMPS, FILTERS, PIPES, TUBING AND VALVES

AD-629 012 Fld. 13/11
CFSTI Prices: HC $22.00 MF $1.25
FRITZ ENGINEERING LAB LEHIGH UNIV BETHLEHEM PA
EFFECT OF IMPELLER DESIGN CHANGES ON CHARACTERISTICS OF A MODEL DREDGE PUMP.
Project rept. no. 33,
by John B. Herbich, and H. R. Vallentine. Sep 61, 224p. Rept. no. FL-277-PR-33,
Contract DA-38-109-CIVENG-59-112,

Unclassified report

Descriptors: (*Pumps, Design), (*Impellers, Design), Models (Simulations), Clay, Silt, Hydraulic pressure pumps

The study was primarily concerned with development of an efficient pump handling silt-clay-water mixtures. One phase of the study involved recommendations for design changes of the dredge pump, involving modifications in the volute and the impeller. In another phase of the study, model investigation of four differently modified impellers was performed with water as well as silt-claywater mixtures. The variables included discharge (0 - 1200 gallons per minute), speed (1150 to 1900 revolutions per minute), and liquid density (1000 to 1380 grams per liter). Preliminary analysis of the data indicates that certain modifications in the exit angle and vane shape of the impeller result in a marked increase in pump efficiency. (Author)

AD-629 405 Fld. 13/11
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
EVALUATION TESTS OF MOSLER BLAST VALVES.
Final rept., Jun 62-Nov 64,
by Mark A. Vispi. Feb 66, 35p. Rept. no. Miscellaneous Paper-1-790,

Unclassified report

Partially supported by DASA.

Descriptors: (*High-pressure valves, Tests), (*Blast, High-pressure valves), Structural properties, Deformation, Performance (Engineering), Disks, Valves

Determinations of closure times, pressure leakage, and structural stability of the valves were primary objectives of the tests. The first valve tested was a blast-actuated, tubular-type valve in which a movable set of steel dowels seals against a stationary set. For the range of pressures tested (3 to 18 psi), the valve closing time was between 4 and 9 msec. Some deformation was observed in the hollow, stainless-steel tubes (dowels) of the valve. The second valve tested was a blast-actuated, disk-type, 16-inch-diameter valve in which the disk seals against a steel seat assembly. This valve was not effective in sealing off the airblasts. The third valve tested was a remote-controlled, pressure -operated cylinder, 36-inch-diameter valve. In a series of 24 opening and closing cycles, the closing time averaged 73.1 msec and the opening time averaged 1.24 seconds; both times are well within the specified range. The valve showed no pressure leakage when subjected to pressures up to 80 psi and no structural damage was observed. Of the three designs tested, this valve gave the best results. (Author)

AD-629 475 Fld. 13/11, 20/4
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
GAS EJECTOR,
by Yu. K. Arkadov. 18 Feb 66, 6p. Rept. no. FTD-TT-65-1782,
TT 66-60735

Unclassified report

Unedited rough draft trans. of Patent (USSR) 171 497, appl. 893302/24-6, 30 Mar 64.

Descriptors: (*Jet pumps, Supersonic flow), Nozzles, Patents, USSR, Jets, Ejection

The object of the invention is a gas ejector which has two or several nozzles for supplying high-pressure gas. To improve the effectiveness by increasing the critical coefficient of ejection, the nozzles are located, one with respect to the other, along the axis of the ejector at a distance equal to the half of the given length of the wave of the supersonic et. (Author)

AD-629 526 Fld. 13/11
CFSTI Prices: HC $4.60 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
DESIGN AND PERFORMANCE OF STAGED STEAM EJECTORS WITH INTERSTAGE CONDENSERS.
Technical rept.,
by F. H. Smith Jr.. Mar 66, 46p. Rept. no. AEDC-TR-65-257,
Contract AF 40 (600)-1200, Proj. AF-9514, Task 951411,

Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Jet pumps, Performance (Engineering)), (*Condensers (Liquefiers), De-

sign), Sprays, Jets, Secondary flow, Nozzles, Cooling

One-dimensional analysis was used to design a staged steam ejector system. The system gives experimental results that are within the predicted performance envelope. The differences between the experimental results and theoretical predictions are critically examined. It was concluded (1) that the design of spray condensers between the ejector stages has an important influence on the overall performance of the system, (2) that the best system performance was obtained when the ejectors were operated at equal primary flow rates, and (3) that the effect of the Mach number of the secondary flow in the region of the ejector steam jet can have a great influence on ejector performance. (Author)

AD-629 650 Fld. 13/11, 13/8
CFSTI Prices: HC $3.00 MF $0.50
BATTELLE MEMORIAL INST COLUMBUS OHIO
EFFECT OF MULTIPLE WELD REPAIRS AND 400F INTERPASS TEMPERATURE ON PIPING PERFORMANCE.
Final rept.,
by R. P. Meister, L. G. Beall, D. E. Conklin, W. S. Hyler, and D. C. Martin. 30 Oct 64, 53p. Contract N102-76878,

Unclassified report

Descriptors: (*Pipes, Performance (Engineering)), (*Welds, Fatigue (Mechanics)), High-temperature research, Joints, Steel, Carbon, Degradation, Nickel, Copper

Multiple weld repairs, either within the confines of the original girth butt welds or extending into the base metal to broaden the weld to 3 times its original width, did not significantly reduce the fatigue properties of carbon-steel joints. Either of the two types of multiple weld repairs caused degradation of fatigue properties of nickel-copper and copper-nickel weld joints. The use of a 400-450 F weld interpass temperature did not lower the fatigue properties of nickel-copper welds. The use of 400-450 F weld interpass temperature did lower the fatigue properties of copper-nickel welds. The fatigue life of joints welded with the consumable insert in the copper-nickel pipe was substantially greater than the fatigue life of weld joints made when using the integral-backing-ring joint design evaluated during the previous program. (Author)

13/12. SAFETY ENGINEERING

AD-629 077 Fld. 13/12, 6/17
CFSTI Prices: HC $2.60 MF $0.50
AEROMEDICAL RESEARCH LAB (6571ST) HOLLOMAN AFB N MEX
FEASIBILITY STUDY: LATERAL IMPACT WITH STANDARD AIRCRAFT HARNESS CONFIGURATION.
Technical rept.,
by Jerry D. Rothstein, and William K. Brown. Feb 66, 27p. Rept. no. ARL-TR-66-3, Contract T-13335 (G)

Unclassified report

Descriptors: (*Safety harness, Impact tests), Feasibility studies, Deceleration, Humans, Aircraft, Configuration

A series of 11 impact tests using the Daisy Decelerator was accomplished to evaluate the adequacy of restraint from lateral impact forces of up to 14 sled G using as minimal restraint, standard aircraft harness and a non-contoured seat. Standard harness would offer greater range of movement to the restrained subject than would be offered by a more complex harness previously proposed and tested for Project Apollo. Results of these 11 tests demonstrated adequacy of restraint with the standard harness at tested impact profiles. It was also observed that when the torso was not laterally supported a shallow, 5.08 cm (2-inch) deep head support was adequate at sled G less than 10 G, above 10 sled G this shallow head support was preferred to a deeper, 17.8 cm (7-inch) head support so that at impact the subject's head can rise out and over the shallow support thereby minimizing the shearing force between the head and laterally moving torso. It was also observed that amplification of G from seat to subject was about the same for both harnesses even though input force was greater in the series using standard harness. This observation suggested greater absorption of impact force by torso movement and strap stretch with standard harness than almost entire force absorption by the rigidly restrained body with more complex harness. (Author)

13/13. STRUCTURAL ENGINEERING

AD-628 978 Fld. 13/13, 13/10
CFSTI Prices: HC $1.00 MF $0.50
FRITZ ENGINEERING LAB LEHIGH UNIV BETHLEHEM PA
STIFFENED PANELS AND WELDED CONTINUOUS FRAMED.
Final rept., 1 Oct 64-30 Sep 65.
25 Feb 66, 6p. Rept. no. 248/273.3,
Contract NObs-90041, Proj. SF013-03-01, Task 1974,

Unclassified report

Descriptors: (*Panels (Structural), Reinforcing materials), (*Structural parts, Welds), Ship plates, Buildings, Metal plates, Stability, Buckling (Mechanics), Beams (Structural), Steel

An investigation was made of the plastic strength of indeterminate steel structures and the study of the plastic behavior of the component parts of such structures. A special portion of the work has been an investigation of the strength of longitudinal stiffened plate panels.

AD-628 981 Fld. 13/13, 20/11, 13/10.1, 13/4
CFSTI Prices: HC $2.00 MF $0.50
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
AN INVESTIGATION OF THE PANEL COLLAPSE STRENGTH OF STIFFENED PLASTIC HEMISPHERES.
Technical rept. on Flight Sciences,
by E. H. Nickell, and J. Skogh. 1 Oct 65, 29p. Rept. no. 6-75-65-53,

Unclassified report

Descriptors: (*Hemispherical shells, Epoxy plastics), (*Panels (Structural), Buckling (Mechanics)), (*Buckling (Mechanics), Hemispherical shell), Reinforcing materials, Deep submergence, Stresses, Submarine hulls, Propellant tanks

Sixteen 18-in. -diameter plastic hemispheres were tested to determine a method of analysis for predicting the collapse strength of panels between the ribs of a stiffened dome. Four hemispheres were unstiffened and 12 hemispheres were stiffened. Five of the 12 stiffened hemispheres had meridional and circumferential stiffeners. Three of the seven models had rib spacing assuming the panel between ribs buckled as shallow spherical segments. The other four domes had rib spacing assuming the panels buckled as flat plates. All of the hemispheres were tested to failure by subjecting them to an external crushing pressure. The results of this study show that: panels between stiffeners of spherical shells can collapse at higher stresses than unstiffened shells, the collapse stress of panels between stiffeners can be predicted by an empirical equation, panels between stiffeners assumed to buckle as flat plates with simply supported edges is too conservative, panel bending stresses can be important for structures subjected to repeated loading conditions yet they may not influence the collapse strength, elastic buckling can occur for very shallow spherical panels, epoxy resin is a satisfactory material for experimental models, requiring high yield strength to density buckling characteristics. (Author)

AD-628 996 Fld. 13/13, 13/2
CFSTI Prices: HC $11.60 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
ECCENTRICALLY LOADED LONG PILES.
Technical rept.,
by J. J. Hromadik, and P. A. Dantz. Feb 66, 113p. Rept. no. TR-R-414,
Proj. Y-R011-01-01-057,

Unclassified report

Descriptors: (*Structural parts, Loading (Mechanics)), (*Reinforced concrete, Structural parts), Mathematical analysis, Graphics, Programming (Computers), Mechanical properties

This study is primarily aimed at improving the understanding of the behavior of eccentrically loaded long piles (or columns) of reinforced concrete. A general inelastic analysis was developed and applied to circular, square, and octagonal cross sections, for both solid members and ones having a hollow circular core. For convenience, the analysis was programmed for the IBM 1620 computer using FORTRAN. Twenty-four general cases are presented in the form of graphs. These graphs were used to evaluate ultimate loads and to study the effect of variables on ultimate loads. Also presented are the results of short-term load tests to failure of 39 specimens representing five basic cross sections. Other major test variables were slenderness and load eccentricity. Good agreement was obtained between theory and test; hence, it may be judged that the basic assumptions are reasonable. Since the theory appears to be confirmed by the test results, it is recommended for use by structural designers. (Author)

AD-629 633 **See Fld. 13/1**

AD-629 634 **See Fld. 13/1**

AD-629 736 **See Fld. 15/3**

Field 14-METHODS AND EQUIPMENT

14/1. COST EFFECTIVENESS

AD-629 082 Fld. 14/1, 12/2
CFSTI Prices: HC $3.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ESTIMATING COST UNCERTAINTY USING MONTE CARLO TECHNIQUES,
by Paul F. Dienemann. Jan 66, 55p. Rept. no. RM-4854-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Uncertainty, Cost effectiveness), (*Cost effectiveness, Uncertainty), (*Monte Carlo method, Uncertainty), Weapon systems, Costs, Decision making, Management planning

Suggested in this memorandum is a technique for expressing cost estimates of future systems as probability distributions to reflect the uncertainty of the estimate. The impact of this information is shown to be relevant to the decision-making process. For the purpose of this study, the relationship between the sources of uncertainty and system cost estimates is depicted as an input-output model. Within this framework, a procedure was developed to estimate probability distributions for each of the input uncertainties. From the input distributions, a Monte Carlo procedure is used to generate a series of system cost estimates. A frequency distribution and common statistical measures are then prepared from the set of output estimates to ascertain the nature and magnitude of the

system cost unertainty. To illustrate the proposed technique, a case study involving the cost estimate of a hypothetical aircraft system with air-to-surface missiles is presented. (Author)

14/2. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-629 004 Fld. 14/2, 1/3
CFSTI Prices: HC $3.00 MF $0.75
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
A SURVEY OF V/STOL WIND TUNNEL WALL CORRECTIONS AND TEST TECHNIQUES,
by John W. Olcott. Dec 65, 87p. Rept. no. 725, Contract Nonr-1858 (14) Proj. NR-212-155,
Unclassified report

Descriptors: (*Vertical take-off planes, Model tests), (*Wind tunnels, Corrections), Test methods, Errors, Wake, Lift, Reviews, Wind tunnel models, Design, Tilt wings, Propellers (Aerial), Airships

A discussion of wind tunnel boundary corrections as they apply to VTOL model testing is presented. Conventional wall correction theory is inadequate since it fails to account for both the presence of a highly developed wake and the total lift acting on the model. Correction theories that do consider the lift and wake characteristics of VTOL designs give satisfactory results, provided there is no wake distortion due to the interference of tunnel walls. Both the Heyson and Kirkpatrick VTOL boundary correction theories are examined and their limitations discussed. A comparison of free air and tunnel results for a .165scale North American Aviation Tilt Wing design and a free air study of an early Hamilton Standard XC 142 propeller model are discussed. The propeller data agreed with theoretically predicted values, but discrepancies, particularly in drag force, appeared when the airship North American Aviation data were compared with similar tunnel results. The exact cause of the differences was not determined. The importance of the VTOL model wake is substantiated. Minimum tunnel sizes necessary to avoid wake impingement and disturbance are presented. (Author)

AD-629 193 Fld. 14/2, 9/5
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
SWEEP OF LOW IMPEDANCE IRON CORE MAGNETS DOWN TO ZERO FIELD,
by H. C. Praddaude. 16 Jun 65, 3p. Contract AF 39(638)-1468,
AFOSR 66-0231
Unclassified report

Availability: Published in The Review of Scientific Instruments v36 n11 p1644 Nov 1965. Copies to DDC users only.

Descriptors: (*Electromagnets, Control systems), Magnetic fields, Reduction, Wiring diagrams, Power supplies

In many experiments in the laboratory, it is desirable to sweep the magnetic field close to zero. Because a residual field remains when the magnet current is reduced to zero, a reverse current is required in order to reduce the field to zero. Since in most magnet power supplies there is no provision built in that allows the magnet current to be reversed, a simple device was built which when properly connected to the magnet, produces a reverse current of up to 1 A. Specifically, the device with a 23 cm, low impedance, Varian magnet with Fieldial power supply was used, but it is clear that the same principle can be used with other low impedance magnets and power supplies, even when no field sweep is available.

AD-629 387 Fld. 14/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
DIGITAL SIMULATION OF A DIGITAL SPECTRUM ANALYZER.
Interim rept.,
by Jarl Johnsen. Jun 65, 43p. Rept. no. U-180,
Unclassified report

Descriptors: (*Spectrum analyzers, Digital systems), (*Digital systems, Spectrum analyzers), Simulation, Digital computers, Narrowband, Filters (Electromagnetic wave)

A digital spectrum analyzer, simulating a bank of narrowband filters followed by square law detectors, is simulated on a digital computer. The analyzer is described and discussion concerning frequency resolution, signal distortion, output signal to noise ratio and the effect of various degrees of quantization is based on data from the simulated analyzer. (Author)

AD-629 414 Fld. 14/2, 20/4
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATION OF ULTRASONIC ATOMIZERS OF LIQUIDS AND MELTS,
by V. P. Popov, and G. K. Goncharenko. 20 Jan 66, 12p. Rept. no. FTD-TT-65-1445, TT 66-60720
Unclassified report

Unedited rough draft trans. of Khimicheskaya Promyshlennost (USSR) n6 p442-5 1964.

Descriptors: (*Liquids, Atomization), (*Atomization, Ultrasonic radiation), Theory, Drops, Heat transfer, Mass transfer, Sprays, USSR, Liquid metals

It was experimentally shown that the distribution of particles in the spray with respect to their diameter in the aggregate has a continuous character under the most diversified conditions of atomization. Therefore, the obtained system of drops can be examined as a static aggregate.

AD-629 542 Fld. 14/2
CFSTI Prices: HC $7.60 MF $0.75
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
REFRACTOMETER RESPONSE TO A HUMID ENVIRONMENT.
Scientific rept. (Interim), 1 Nov 64-31 Oct 65,
by Donald R. Hay, H. Edward Turner, and Chialuan Ting. Nov 65, 70p. Rept. no. Scientific-TP-2, Contract AF 19(628)-3835, Proj. AF-6682, Task 668204,
AFCRL 65-885
Unclassified report

Descriptors: (*Refractometers, Environmental tests), (*Humidity, Refractometers), Air, Water vapor, Optical properties, Adsorption, Condensation

The theory of the ellipsometric technique for observing the vapour layer on the sensing element of a refractometer has been examined and an assessment made of its precision of measurement. This instrument shows that an invisible layer of adsorbed water vapour forms on the sensing element of the refractometer at humidities exceeding 60 percent (for temperatures about 20C) and the depth increases to 1500 A as its refractivity increases to 1.025 near saturation. At saturation, microscopic droplets form on the sensor surface, apparently in association with surface contamination. The refractometer anomaly depends upon the method of vapour injection into the environment: it is the same for relative humidities increasing to 75 percent when the vapour is injected either by steam or by pan evaporation; at higher humidities, the larger vapour droplets from steam produce a greater anomaly in indicated refractivity. Vapour injection by slow evaporation produces a lesser anomaly than that by rapid evaporation; lower temperatures also are associated with smaller refractometer anomalies. Preliminary observations in the tunnel have been made at sub-freezing temperatures with different techniques of vapour injection. (Author)

AD-629 590 Fld. 14/2, 20/6
CFSTI Prices: HC $2.00 MF $0.50
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
A THERMAL RADIATION HEAT SOURCE AND IMAGING SYSTEM FOR BIOMEDICAL RESEARCH,
by David L. Richardson. 15 Dec 65, 48p. Contract N62269-1388, Task RA-150-J-059/2021/F022-01-03,
NADC MR-6503
Unclassified report

Descriptors: (*Laboratory equipment, Medical research), (*Thermal radiation, Medical research), (*Optical equipment, Thermal radiation), Images, Mirrors, Refraction, Lenses, Ellipsoids, Parabolic bodies, Absorption spectrum, Xenon lamps, Radiometers, Pyrometers, Heat flux, Radiation effects, Tissues (Biology), Instruction manuals

The purpose of this investigation was to provide a more advanced radiant heat source capable of heating an area of 1 sq cm with up to 15 cal/sq. cm - sec of radiant heat flux with a uniformity of plus or minus 1 percent. The source and the optical imaging system were to provide a high degree of stability and reproducibility for extended periods. The imaging system is to be used in a study of the effects of intense thermal-radiation on living tissues being carried out at the U.S. Naval Air Development Center in Johnsville, Pa. The specified radiant heat flux and uniformity has been achieved by using a resistance heated graphite element, 16 mm wide and 38 mm long, as the radiation source in conjunction with a compound thermal imaging system. A heat flux-redistributor installed external to the system provided the desired flux uniformity. An operation manual for the source and imaging system is included as an Appendix to the report. (Author)

AD-629 752 Fld. 14/2, 9/3
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
CALIBRATION FACILITY FOR RF QUANTITIES OFFERS CENTRAL TIE-IN FOR TESTING LABS,
by Richard F. Clark, A. Jurkus, and C. F. Pattenson. 1965, 6p.
NRC 8871
Unclassified report

Availability: Published in Canadian Electronics Engineering Feb 1966. Copies to DDC users only.

Descriptors: (*Radiofrequency, Standards), (*Calibration, Radiofrequency), Frequency, Power, Attenuation, Electrical impedance, Voltage, Canada

The Radio and Electrical Engineering Division of the National Research Council has for some time been setting up a calibration facility for measurement of radio frequency quantities. It is intended as a reference for the calibration of transfer standards for other laboratories in Canada. The standards developed in the R and EE laboratories are referred to the Canadian standards of frequency, length, voltage and resistance, maintained by the NRC. The main function of a central calibration facility is to provide correlation among various standardizing laboratories. At the present time the main interest of the R and EE division is in measurement of power, attenuation, impedance, voltage and frequency.

AD-628 894 See Fld. 21/8

AD-628 928 See Fld. 20/7

AD-628 946 See Fld. 5/1

AD-628 958 See Fld. 19/1

AD-629 046 See Fld. 8/7

AD-629 070 See Fld. 21/9

AD-629 328 See Fld. 19/4

AD-629 454 See Fld. 17/9

AD-629 607 See Fld. 18/6

AD-629 652 See Fld. 7/4

AD-629 672 See Fld. 8/10

AD-629 719 See Fld. 20/13

AD-629 743 See Fld. 9/5

14/3. RECORDING DEVICES

AD-629 101 Fld. 14/3, 6/12, 6/19
DEFENCE RESEARCH MEDICAL LABS TORONTO (ONTARIO) SENSORY CAPACITIES SECTION
A NOISE EXPOSURE DURATION INDICATOR.
Technical note,
by R. A. Stong, and Keith K. Neely. 30 May 65, 3p.
DRML TN-564

Unclassified report

Availability: Published in F. Sound Vib., v3 n1 p1-3 1966. Copies to DDC users only.

Descriptors: (*Noise, Measurement), (*Electronic recording systems, Noise), Hearing, Exposure, Time studies, Intensity, Audiofrequency, Deafness, Canada

A small lightweight noise exposure duration indicator is described, which records the cumulative time for which one of five pre-set sound pressure levels of noise is exceeded. (Author)

AD-629 140 Fld. 14/3, 9/5
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF MARINE PHYSICAL LAB
SIMPLE SWITCHING CIRCUIT THAT KEEPS RECORDER ON SCALE,
by Clement S. Pepper. 28 May 65, 2p. Rept. no. MPL-U-30/65,
Contract Nonr-2216 (05),

Unclassified report

Availability: Published in The Review of Scientific Instruments, v36 n10 p1500 Oct 1965. Copies to DDC users only.

Descriptors: (*Switching circuits, Recording systems), (*Recording systems, Control systems), Diodes (Semiconductor), Electronic switches, Instrumentation

Portions of data being recorded in a chart recorder are lost if signal variations exceed the recorder range. In many instances, such loss can be averted by tracking the recorder with a meter relay controlling a rotary selector switch to make corrective range adjustments at the input. A simple transistor switching circuit employing 4-layer breakdown diodes provides the connecting link between relay and the rotary selector. (Author)

AD-629 693 See Fld. 5/7

14/4. RELIABILITY

AD-629 084 Fld. 14/4
CFSTI Prices: HC $1.60 MF $0.50
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
CONDITIONAL DISTRIBUTION OF TRUE RELIABILITY AFTER CORRECTIVE ACTION.
Technical rept./Research paper,
by Harold J. Larson. Jan 66, 18p. Rept. no. tr/rp-61,

Unclassified report

Descriptors: (*Reliability, Determination), Operations research, Corrections, Probability, Tests, Management planning

Attempts are made to correct those failure modes that occur; the probabilities that these attempts are successful are assumed known. The conditional distribution of the resulting true reliability is derived and used to construct observable limits which will include the true reliability with a known probability. (Author)

AD-629 381 Fld. 14/4, 12/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
ESTIMATING MEAN RELIABILITY GROWTH.
Technical rept./Research paper,
by Peter W. Zehna. Jan 66, 27p. Rept. no. RP-60,
Proj. 46058,

Unclassified report

Descriptors: (*Reliability, Statistical analysis), (*Systems engineering, Reliability), Model theory, Probability, Operations research

A model is defined wherein corrective action may be accounted for in improving the estimation of reliability over the usual nominal success ratio. Probabilities for correcting any one of K failure modes which may arise are assumed known within the structure of a multinomial sampling procedure. Mean reliability is defined as a function of the unknown probabilities attached to the failure modes, the problem being to estimate this mean. Other measures of current reliability are defined. Three different estimators of mean reliability are defined and analyzed from the point of view of unbiasedness. Explicit expressions for the bias are derived and compared numerically for a wide variety of choices for the unknown parameters. Several problem areas for further research are identified and partial formulations of some of these are discussed. (Author)

AD-629 145 See Fld. 15/5

14/5. REPROGRAPHY

AD-629 513 Fld. 14/5, 9/5
ARMY ELECTRONICS LABS FORT MONMOUTH N J
MICROCIRCUIT PHOTOMASKS FROM AUTOMATIC TECHNIQUES,
Revised ed.,
by W. B. Glendinning, and S. Marshall. 23 Aug 65, 6p.

Unclassified report

Revision of manuscript submitted 25 May 65.

Availability: Published in IEEE Transactions on Electron Devices vED12 n12 p638-42 Dec 1965. Copies to DDC users only.

Descriptors: (*Photoengraving, Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Photoengraving), Light, Projection printers, Photographic plates, Optical equipment, Circuits, Manufacturing methods, Automatic

A new method for rapidly constructing photographic masks which are required in the fabrication of microelectronic circuits is described. The method employs an optical projection technique to obtain a precisely defined pencil of light which is used for 'writing' on a high resolution photographic plate. The photomask geometry is exposed in a raster-like format by accurate servo-controlled translation of the high resolution plate with respect to the projected light beam and by relay controlled automatic shuttering employed in conjunction with the operation of the servosystem. The automatic projection method provides an inherent optical reduction factor of 2 to 22 times and has permitted one-step fabrication of master photomasks having image characteristic tolerances and definitions as follows: vertical positional of =50.0 microns, horizontal positional of =10.0 microns, vertical edge of less than 2.5 microns, the horizontal edge of less than 25.0 microns. Writing speeds of 2.0 to 80.0 mils per second were used to produce line widths from 6.0 to 100.0 microns. (Author)

AD-629 453 See Fld. 1/2

AD-629 471 See Fld. 20/4

Field 15-MILITARY SCIENCES

15/2. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-629 181 See Fld. 2/6

AD-629 667 See Fld. 6/3

15/3. DEFENSE

AD-629 139 Fld. 15/3, 2/2, 15/6, 6/18
CFSTI Prices: HC $19.20 MF $1.25
STANFORD RESEARCH INST MENLO PARK CALIF
POSTATTACK FARM PROBLEMS. PART II. ATTACK EFFECTS ON INPUTS AND FARM OUTPUT,
by Oliver E. Williamson, and Kendall D. Moll.
Oct 61, 196p. Contract CDM-SR-59-19,CDM-SR-60-37 Proj. SRI-IMU-3084,

Unclassified report

Descriptors: (*Radiological warfare, Agriculture), (*Agriculture, Radiological contamination), (*Civil defense systems, Agriculture), Nuclear warfare, Management planning, Survival, Radioactive fallout, Fallout shelters, Food, Production, Humans, Animals, Vulnerability, Manpower studies, Gasoline, Fertilizers, Electricity, Insecticides, Pesticides, Irrigation systems, Seeds

Farm food production in the first year after a nuclear attack might be less than demands of the surviving population unless several major adaptations are made. With mobilization measures such as conversion of croplands from non-food and livestock feed production to human food production and use of surplus commodity stocks for livestock feed, adequate production could probably be maintained. Food production would increase in subsequent years unless national recovery were prevented by continued unsettled conditions. Contamination of cropland and losses of livestock would probably be the most serious constraints to agricultural production for the first postattack year. However, if fallout effects on cropland and livestock were less serious than currently estimated, casualties among farmers could be the chief constraint. In any event, production would probably be limited primarily by one of these constraints, rather than by the cumulative effects of less critical inputs. Estimates of production for a range of assumptions about human, animal, and crop vulnerabilities to attack are given. (Author)

AD-629 736 Fld. 15/3, 13/13
CFSTI Prices: HC $1.60 MF $0.50
PROTECTIVE STRUCTURES DEVELOPMENT CENTER FORT BELVOIR VA
FAMILY SHELTER WOOD A-FRAME.
Final technical rept.,
by Michael M. Dembo, and Herbert C. Lamb. 8 Oct 65, 18p. Rept. no. PSDC-TR-10,
Unclassified report

Descriptors: (*Fallout shelters, Construction), Civil defense systems, Materials, Wood, Radioactive fallout, Shielding, Ventilation, Blowers, Power supplies, Costs

Construction plans, details and bill of materials for a simple dual-purpose wood A-frame type family fallout shelter are presented. Shelter for 10 persons, based on minimum OCD shelter space requirements, is provided. Radiation shielding to provide a protection factor of 100 is provided by earth mounding over the wood frame. Ventilation for the occupied shelter would have to provided through manual or manual-electric blowers depending on availability of electric power during the occupancy period. (Author)

AD-629 633 **See Fld. 13/1**

AD-629 634 **See Fld. 13/1**

15/4. INTELLIGENCE

AD-629 444 **See Fld. 5/7**

AD-629 704 **See Fld. 20/6**

15/5. LOGISTICS

AD-628 900 Fld. 15/5, 9/2
CFSTI Prices: HC $3.00 MF $0.75
MILITARY TRAFFIC MANAGEMENT AND TERMINAL SERVICE WASHINGTON DC
DATA AUTOMATION REQUIREMENT FOR THE STRATEGIC MOBILITY PLANNING AND ANALYSIS SYSTEM (STRATMAS).
28 May 65, 65p.
Unclassified report

Descriptors: (*Data processing systems, Military requirements), Systems engineering, Armed forces transportation, Management planning, Operations research

AD-629 131 Fld. 15/5, 5/1
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
LOGISTICS SYSTEMS CAPACITY,
by David S. Stoller. Jan 66, 48p. Rept. no. rm-4852-PR,
Contract AF 49 (638)-1700,
Unclassified report

Report on Project RAND.

Descriptors: (*Logistics, Systems engineering), (*Management planning, Logistics), Industrial production, Production control, Statistical analysis, Economics, Operations research

The object of the study was to examine fundamental concepts useful in measuring the performance of logistics systems and their possible application to management problems. The author compares some of the general categories of industrial capacity concepts to the fundamental parameters of logistics systems capacity. A performance model of a simple logistics system was developed, and the capacity parameters were calculated and applied to typical management problems. It was found that logistics system capacity is useful for performance models and consistent with definitions of industrial capacity, and that it provides managers and management analysts with simple tools for assessing logistics system performance and for acquiring clear inputs to determine system effectiveness. (Author)

AD-629 145 Fld. 15/5, 14/4, 5/5
CFSTI Prices: HC $24.60 MF $1.25
NAVAL APPLIED SCIENCE LAB BROOKLYN N Y
PROCEEDINGS OF THE NMSE SYSTEMS PERFORMANCE EFFECTIVENESS CONFERENCE, CIVIL SERVICE COMMISSION AUDITORIUM, WASHINGTON, D. C., 27-28 APRIL 1965,
by Robert J. Suslowitz. 28 Apr 65, 250p.
Unclassified report

Descriptors: (*Systems engineering, Logistics), (*Logistics, Systems engineering), Reliability, Maintainability, Human engineering, Effectiveness, Performance (Human), Navy, Man-machine systems, Symposia

The document contains nineteen papers which summarize the status of the rapidly expanding Navy wide effort in systems effectiveness. Some of the topics covered in these papers include: reliability, maintainability, logistic and technical support, and subsystem performance of both the man and the machine. (Author)

AD-629 544 Fld. 15/5
CFSTI Prices: HC $3.00 MF $0.75
AUTONETICS ANAHEIM CALIF RESEARCH AND ENGINEERING DIV
A STUDY OF MILITARY ELECTRONIC AND ELECTROMECHANICAL SPECIFICATION PART IDENTIFICATION REQUIREMENTS.
Final rept., 1 Dec 64-30 Jun 65,
by D. E. Brown, and R. H. Carter. Feb 66, 64p.
Contract AF 30 (602)-3590, Proj. AF-5519, Task 551902,
RADC TR-65-273
Unclassified report

Descriptors: (*Logistics, Inventory control), (*Electronic equipment, Inventory control), (*Inventory control, Electronic equipment), Military equipment, Coding, Identification, Specifications, Standardization

Part Marking: Lack of uniform requirements for marking of military parts together with the progressive decrease in size of electronic components presents problems in identifying components for replacement and failure analysis. A uniform system of marking is recommended which is based on the Federal Supply Code (H4-1), Date Code (MIL-STD-456) and the part number recommended in Section B (Part Numbering) of this report. Part Numbering: There is little consistency in the method of creating identifying part numbers in military specifications. Industry is divided between favoring significant or nonsignificant part numbers. This study, initiated to analyze existing and potential numbering systems, has resulted in a recommendation that a uniform system be established based on the specification number. The recommendation includes provisions for both partially significant and nonsignificant dash numbers depending upon the situation. (Author)

15/6. NUCLEAR WARFARE

AD-629 139 **See Fld. 15/3**

15/7. OPERATIONS, STRATEGY, AND TACTICS

AD-629 350 Fld. 15/7
CFSTI Prices: HC $2.60 MF $0.50
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
OPTIMUM SUBMARINE ROUTING.
Technical rept./Research paper,
by F. D. Faulkner. Jan 66, 27p. Rept. no. TR/RP-63,
Proj. 46058, Task 88423,
Unclassified report

Descriptors: (*Submarines, War games), (*Undersea warfare, Submarines), (*War games, Submarines), Underwater navigation, Optimization, Numerical methods and procedures, Detection, Probability, Naval operations, Programming (Computers)

A numerical routine is developed to determine on a digital computer a route that will enable a submarine to go from one specified point to another in a specified time, with minimum probability of being detected, when the likelihood of being detected is a known function of the position, heading, speed, depth, and time. Special routines are required to handle bounds on the control variable and corners. (Author)

AD-629 351 Fld. 15/7, 12/2, 9/2
CFSTI Prices: HC $5.60 MF $0.75
NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF
A MINE SWEEPER COMPUTER SIMULATION.
Technical rept./Research paper,
by Alvin F. Andrus, and Patricia R. Hoang. Feb 66, 60p. Rept. no. tr/rp-64,
Proj. 02551, Task WEPTASK R520-00-010/551,
Unclassified report

Descriptors: (*Naval mine warfare, Simulation), (*War games, Programming (Computers)), (*Programming (Computers), Naval mine warfare), (*Mine clearance, Naval mines), Operations research, Monte Carlo method, Naval operations

A probabilistic computer simulation, constructed under very simplifying assumptions, of mine sweeper operations is presented. The model is described along with its associated input and output formats. A listing of the CDC FORTRAN-60 program and a sample output from several computer runs are included. The model was constructed as a pedagogical tool in an attempt to familiarize beginning students of Operations Research with the Monte Carlo method as applied in computer war gaming. (Author)

AD-629 129 **See Fld. 12/2**

AD-629 197 **See Fld. 17/1**

Field 16-MISSILE TECHNOLOGY

16/2. MISSILE TRAJECTORIES

AD-629 390 **See Fld. 16/3**

16/3. MISSILE WARHEADS AND FUZES

AD-629 390 Fld. 16/3, 16/2
CFSTI Prices: HC $3.00 MF $0.75
VITRO LABS SILVER SPRING MD
THE LETHAL VOLUME OF A CONTINUOUS ROD WARHEAD,
by William E. Reynolds. Jun 65, 81p. Rept. no. EA-1,
Unclassified report

Master's thesis submitted to American Univ., Washington, D. C., 1965.

Descriptors: (*Continuous rod warheads, Impact prediction), (*Kill probabilities, Continuous rod warheads), Guided missile targets, Volume, Effectiveness

The lethal volume of a continuous rod warhead is defined as that volume in which a target reference point must be located at burst if the target

is to be subjected to a lethal cut from the rod. The lethal volume is a function of the characteristics of the target, warhead, and intercept dynamics. The target is assumed to be a single, linear, rigid, and nonrotating structural member. The lethal volume is obtained for this target by examining the relative motion of the target and of the rod with respect to the missile carrying the warhead. Under the assumption of constant rod velocity, the lethal volume is shown to be composed of linear segments joining two identical right elliptic cones. Expressions for the size and probability content of the lethal volume are then obtained for the constant rod velocity case. A numerical scheme is discussed with which the probability content of the lethal volume can be evaluated. Parameter variation studies, which can be performed with the lethal volume model, are discussed. The variation in the size and probability content of the lethal volume is computed for several combinations of the input parameters. (Author)

16/4. MISSILES

AD-629 581 Fld. 16/4
CFSTI Prices: HC $4.00 MF $1.00
BOLT BERANEK AND NEWMAN INC CAMBRIDGE MASS
DYNAMIC RESPONSE, ENERGY METHODS, AND TEST CORRELATION OF FLIGHT VEHICLE EQUIPMENTS.
Report for 1 Jan 64-31 Mar 65,
by Denis U. Noiseux, Richard H. Lyon, Charles W. Dietrich, and Edward A. Starr. May 65, 144p. Rept. no. BBN-1242,
Contract AF 33 (615)-1302, Proj. AF-1309, Task 130904,
AFFDL TR-65-92-Vol-I
Unclassified report

Descriptors: (*Electronic equipment, Guided missiles (Surface-to-surface)), (*Dynamics, Failure (Electronics)), Vibration, Environmental tests, Guided missile components

This study is primarily concerned with extension and application of energy methods to structural responses. Analysis and tests of a three-element structure are presented. Confidence limits for the case of acoustic excitation have been added. Equivalent electrical circuit approaches to energy diagrams have been extended and formalized. Extensive tests on an Atlas Guidance Computer are reported; its acoustic radiation couplings, mechanical couplings, and loss factors have been measured; the vibration and acoustic environments as they contribute to the response of circuit boards have been simulated and considerably exceeded with small mechanical shakers, and with a periodic impact tool. A study of the failure mechanisms and failure levels of diodes in the Computer is included. (Author)

AD-629 284 See Fld. 20/4

Field 17-NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17/1. ACOUSTIC DETECTION

AD-629 197 Fld. 17/1, 15/7
CFSTI Prices: HC $1.60 MF $0.50
ARMY INFANTRY HUMAN RESEARCH UNIT FORT BENNING GA
POSSIBLE COMBAT APPLICATION OF EXPERIMENTAL STEALTH MEASURING DEVICE.
Research memo.,
by Frank L. Brown. Jan 59, 22p. Rept. no. RM-9,
Unclassified report

Descriptors: (*Acoustic detectors, Armed forces supplies), (*Noise analyzers, Armed forces supplies), Measurement

An experimental sound detection device was assembled for monitoring noise made by members of patrols approaching specified objectives during night reconnaissance patrol. The array consisted of (1) speakers, used in lieu of microphones, of the type employed with sound amplifier equipment, (2) a 3-stage transistorized amplifier, (3) B1 and B2 batteries as power sources, and (4) connecting wire. Fourteen separate arrays of 3 speakers each were used, with about 200 meters between adjacent arrays, to cover a front of about 2600 meters. Sounds, including heavy breathing, low-voiced conversation, and footsteps, were detected without difficulty.

AD-629 427 Fld. 17/1
CFSTI Prices: HC $3.60 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
AURAL DETECTION AND IDENTIFICATION OF THE PRESENCE OF PERSONNEL.
Final rept.,
by John W. Black. 1 Nov 58, 34p. Rept. no. 725-F,
Contract DA-19-129-QM-793, Proj. DA-7-79-10-001B,
Unclassified report

Descriptors: (*Personnel, Detection), (*Detection, Personnel), (*Identification systems, Sound), Magnetic recording systems, Auditory perception, Swamps, Trees, Acoustics, Terrain, Noise

Procedures, equipment, and environmental factors involved in obtaining 96 recorded acoustic samples of men walking, representative of four distances, six terrains, and four numbers of participants are described. Spectral analyses and analyses of the sound-pressure levels of the recordings were made. The terrains fell into three distinct groupings in terms of over-all level. The four distances (and sizes of parties) were orderly if viewed as three distances (and sizes), the two mid-distances (or mid-sizes) being pooled. The 96 recorded sounds of walking were heard by two trained observers. According to their judgments forest was more noisy than would have been predicted from the physical analysis; swamp was consistent in terms of judgments and physical measures. Attention was directed to the relative importance of frequencies 2000-6000 cps in terms of aural detection. Twenty db of recorded wind scarcely provided a masking sound; the same intensity of recorded rain shifted the detection threshold 5 db. A multiple-choice response form was devised through accumulating frequently occurring error response to the task of identifying the sound that was heard. This form permitted scoring correct identification and the spread of responses. (Author)

AD-629 724 Fld. 17/1
CFSTI Prices: HC $2.60 MF $0.50
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AERO-ELECTRONIC TECHNOLOGY DEPT
AUTOMATIC SONOBUOY FUNCTION SELECTOR.
Phase rept.,
by E. J. Cotilla. 26 Jan 66, 21p. Rept. no. nadc-AE-6526,
Task ASW213000/2021/F101-13-01,
Unclassified report

Descriptors: (*Sonar equipment, Buoys), (*Hydrophones, Buoys), Depth indicators, Life expectancy, Selection, Automatic, Launching, Sliding contacts, Electrical switches, Control systems

An in-house program was conducted to develop a method to automatically select a sonobuoy function, i.e., life or hydrophone depth as the sonobuoy is launched from an aircraft. This report contains a discussion of the design approach, a description of the selected method and a list of the test results. (Author)

17/2. COMMUNICATIONS

AD-628 980 Fld. 17/2, 9/5
CFSTI Prices: HC $5.00 MF $1.00
CBS LABS STAMFORD CONN
TRANSDUCER AND INTERCOMMUNICATION SYSTEM FOR AIR CREWMAN'S PROTECTIVE HEADGEAR.
Rept. no. 4 (Final), 1 Jul 64-30 Sep 65,
by Allan J. Rosenheck, Frank L. Ragonese, Edward J. Foster, Alfred L. DiMattia, and Arthur Kaiser. 30 Sep 65, 166p. Contract DA-28-043-AMC-00282 (E), Proj. DA-1G6-41209-D-534-24-10,
Unclassified report

See also AD-610 478.

Descriptors: (*Intercommunication systems, Helmets), (*Voice communication systems, Design), (*Transducers, Intercommunication systems), (*Helmets, Aviation personnel), Speech, Intelligibility, Earphones

A final model earphone enclosure assembly was developed based upon the low-frequency-coupled principle. The APH-5 helmet was modified to accommodate this assembly and the tubular microphone shield assembly. An articulation analysis of the completed exploratory development model helmet transducer system was conducted using prediction techniques. Results of the development and an evaluation of the exploratory development model of a wireless voice intercommunication system having 'party-line' or 'round table' communication capability is presented. The system is a portable, lowpower, battery-operated unit using the single-sideband suppressed carrier (SSBSC) type of transmission. Carrier frequency is 20.45 megahertz and the range is 100 yards. Test results adequately demonstrated the feasibility of 'break-in' or 'party-line' operation.

AD-628 988 Fld. 17/2
CFSTI Prices: HC $5.00 MF $1.00
MOTOROLA INC CHICAGO ILL COMMUNICATIONS DIV
DATA TRANSMISSION INVESTIGATION (SHORT RANGE HF RADIO DATA TRANSMISSION).
Final rept., 4 Jan-18 Dec 65,
by R. F. Salava. 18 Dec 65, 184p. Contract DA-28-043-AMC-00478 (E)
Unclassified report

Descriptors: (*Data transmission systems, High frequency), Radio transmission, Attenuation, Multipath transmission, Radio equipment, Digital systems, Performance (Engineering), Phase measurement

The short range HF radio link was analyzed for its capability in transmitting digital data. The report presents and discusses results obtained in field tests conducted over the radio link of lengths 25, 47, 65, 94, and 220 miles. The equipment used for conducting the tests are also described in detail. The tests include: general observations of link conditions, data transmission test with and without inband diversity, phase measurement test to define the coherency of the short range HF path, fade measurement test of several CW tones to define the depth, length, rate and degree of frequency selective fading, multipath test to aid in determining the severity of multipath. Two radio sets were used to conduct the field test. The major radio set was a commercial SSB radio set with the AGC defeated to permit the measurement of the HF path for its fading characteristics. The second radio set was the AN/GRC-106 which was briefly used to test its capability of transmitting digital data. The results of the aforementioned tests are presented in tabular and graphical form. Diurnal variations, channel conditions, expected data transmission performance, and the 'optimum' signaling element length for data transmission over the HF path is discussed. (Author)

AD-628 993 Fld. 17/2
CFSTI Prices: HC $3.00 MF $0.50
ELECTRICAL ENGINEERING RESEARCH LAB CORNELL UNIV ITHACA N Y
MAXIMAL-RATIO DIVERSITY COMBINERS.
Technical research rept.,
by N. Thomas Gaarder. Jan 66, 51p. Rept. no. TR-90,EERL-49
Contract DA-36-039-AMC-0034 (E), Task 1G6-22001-A-055-02,
Unclassified report

Descriptors: (*Communication systems, Diversity reception), (*Diversity reception, Communication systems), (*Signal-to-noise ratio, Diversity reception), Mathematical models, Diversity radar, Stochastic processes

This report analyzes a maximal-ratio diversity combiner that is typical of the type of diversity combiner used in a wide range of communication and radar systems, including conventional frequency-shift-keyed, differentialphase-shift-keyed, and transmitted reference communication systems, as well as predetection combining systems. When the combiner inputs are independent and identically distributed Gaussian random processes, it is found that the combiner output can be conveniently represented as a product and sum of known time functions, a Gaussian random process, a chi variate, and a Gaussian variate. This representation clearly indicates the performance gain obtained by using diversity. In addition, it simplifies the evaluation of expectations on the combiner output; by using this representation, recursion relations (with respect to the order of diversity) for any well-defined expectation of a function of the combiner output are found. The results of this paper serve to unify and generalize many results dealing with maximal-ratio diversity combiners; in addition, many well-known results can be extended easily by suing the recursion relations. (Author)

AD-629 242 Fld. 17/2, 20/6
CFSTI Prices: HC $2.00 MF $0.50
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
MICROWAVE OPTICAL RECEIVER TECHNIQUES.
Interim engineering rept. no. 3, 1 Dec 65-28 Feb 66,
by J. Richard Kerr. 28 Feb 66, 42p. Contract AF 33 (615)-3108,
Unclassified report

See also AD-625 382.

Descriptors: (*Light communication systems, Demodulators), (*Demodulators, Light communication systems), (*Microwave communication systems, Light communication systems), (*Electrooptics, Light communication systems), Atmosphere, Light transmission, Optical equipment, Lasers, Light, Frequency modulation

This report represents the results of the third quarter of effort on a one-year applied research program on the use of various techniques for microwave optical communications through the atmosphere. Various techniques for microwave optical heterodyning are evaluated, and it is shown that the transition from a laboratory to a field environment is not a straightforward one. A direct detection experiment through the atmosphere with an avalanche photodiode containing a very small active area has shown that atmospheric turbulence need not limit the performance of such devices beyond those effects which apply to all incoherent optical receivers. A novel modulation-demodulation scheme is proposed in which an arbitrarily large Pockels cell index may be used with zero distortion in the received signal. (Author)

AD-629 352 Fld. 17/2, 9/5
CFSTI Prices: HC $3.00 MF $0.75
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y
MILITARY COMMUNICATIONS SWITCHING SYSTEM DESIGN.
Technical rept.,
by Allan A. Kunze. Jan 66, 66p. Rept. no. RADC-TR-65-483,
Proj. AF-DP-64-23,
Unclassified report

Descriptors: (*Communication systems, Switching circuits), (*Electronic switches, Communication systems), State-of-the-arts reviews, Military requirements, Networks, Real time, Electronic equipment, Communication equipment, Control systems

The past few years have witnessed the rapid evolution of communications switching. As in many other technical areas, requirements of the defense community have tended to outstrip technological progress. The result is that military communications switching systems that are now, or shortly will be, in operation are doomed to varying degrees of obsolescence in the not-too-distant future. This technical report is intended to review the state of the art in the area of communications switching, examine major problems and recommend areas of investigation. The report covers four major topics: (1) Military Commuications Switching Requirements, based on Military Standard 188B, which was released early in 1964. (2) Switching System Design Problems, including a discussion of switching fundamentals and a description of the influence of system requirements on the choice of techniques and devices used for implementation. (3) The State of the Art in communications switching, from the point of view of system operation and useful or promising devices. () Recommended Research and Development Efforts, indicating technical areas in which such efforts should result in worthwhile additions to the communications switching discipline. (Author)

AD-629 354 Fld. 17/2, 9/4, 9/2
CFSTI Prices: HC $2.60 MF $0.50
AUTOMATIC DATA FIELD SYSTEMS COMMAND FORT BELVOIR VA
DATA TRANSMISSION, ERROR CONTROL AND COMMUNICATIONS SECURITY.
Technical documentary rept.,
by Fletcher J. Buckley. Feb 66, 30p. Rept. no. 04-01-02,
Unclassified report

Descriptors: (*Data transmission systems, Army equipment), (*Errors, Information theory), (*Communication systems, Army equipment), Coding, Corrections, Computers, Pulse code modulation, Military requirements, Digital systems, Cryptography

Data Transmission, Error Control and Communications Security are three closely-related areas requiring detailed systems consideration when designing an ADP complex. This paper provides a basis for understanding these individual fields, shows that they are part of an overall system and points out that choices made in one can seriously affect the other two and the entire system Areas where additional work is required are also identified. (Author)

AD-629 473 Fld. 17/2, 22/1
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
A RED BEAM IN THE BLACK SKY,
by V. Chernyshev. 1 Feb 66, 10p. Rept. no. FTD-TT-65-1683,
TT 66-60733
Unclassified report

Unedited rough draft trans. from Krasnaya Zvezda, (USSR) 14 Mar p1 1965.

Descriptors: (*Lasers, Space communication systems), (*Space communication systems, Astronautics), Space flight, Ruby, Atmosphere, Semiconductors, USSR

AD-629 550 Fld. 17/2, 20/2, 6/1
CFSTI Prices: HC $4.00 MF $1.00
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
INVESTIGATION OF LARGE-AREA DISPLAY SCREEN USING LIQUID CRYSTALS.
Final technical rept. 1 Jun 64-4 Jun 65,
by Charles H. Jones, J. L. Fergason, J. A. Asars, I. Liberman, and W. J. Harper. Dec 65, 143p.
Contract AF 30 (602)-3388, Proj. AF-5597, Task 559703,
RADC TR-65-274
Unclassified report

Descriptors: (*Viewing screens, Cholesterol), (*Cholesterol, Viewing screens), (*Communication equipment, Viewing screens), (*Crystallography, Cholesterol), Liquids, Crystals, Biochemistry, Television display systems, Command + control systems, Temperature sensitive elements, Color television

This report describes the properties of temperature sensitive cholesteric liquid crystals that are pertinent to their applications in large area displays. An experimental 10 in. x 12 in. display panel was built to demonstrate the color, resolution and time constant capabilities of liquid crystals. Five different methods for obtaining dynamic thermal patterns in response to video signals are described. The application will dictate which method should be used for any given display problem. Considerable experimental work has been carried out on those methods which appear to be of most practical usefulness. (Author)

AD-628 946 See Fld. 5/1

AD-628 991 See Fld. 17/8

AD-629 225 See Fld. 5/2

AD-629 361 See Fld. 9/2

AD-629 408 See Fld. 9/4

AD-629 503 See Fld. 20/5

17/2.1 RADIO COMMUNICATIONS

AD-629 403 Fld. 17/2.1, 9/5
SYRACUSE UNIV N Y DEPT OF ELECTRICAL ENGINEERING
REDUCING NONLINEAR DISTORTION DUE TO AUTOMATIC-GAIN-CONTROL CIRCUITS,
by R. McFee, and S. Dick. 24 May 65, 3p. Contract DA-31-124-ARO (D)-87,
AROD 3999:2
Unclassified report

Availability: Published in Electronics Letters v1 n4 p102-4 Jun 1965. Copies to DDC users only.

Descriptors: (*Automatic gain control, Distortion), (*Optimization, Automatic gain control), (*Radio equipment, Transistors), Circuits, Diodes

In many modern transistor radios there is substantial distortion with strong signals as a result of the sharp cutoff characteristics of variable-gain trnasistors. In this note, the problem is analysed. It is shown that the defect can be corrected using biased diodes as gain -control elements. (Author)

AD-629 516 Fld. 17/2.1, 9/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH NJ
BEAM NOISE REDUCTION IN HIGH MAGNETIC FIELDS,
by Bruno Zotter. 8 Oct 65, 1p.
Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p2160 Dec 1965. Copies to DDC users only.

Descriptors: (*Electron beams, Noise (Radio)), (*Noise (Radio), Electron beams), Noise, Reduction, Magnetic fields, Traveling wave tubes

AD-629 584 Fld. 17/2.1
CFSTI Prices: HC $2.60 MF $0.50
AEROSPACE CORP SAN BERNARDINO CALIF
COMPUTER STUDY OF A DIVERSITY AUGMENTED, VEHICULAR, RADIO COMMUNICATION SYSTEM IN A MANMADE NOISE ENVIRONMENT.
Technical rept., 1 Jan-31 Dec 65,
by Edward N. Skomal, and Kenneth C. Reed.
Feb 66, 27p. Rept. no. TR-669 (S6951-24)-3,
Contract AF 04 (695)-669,
BSD TR-66-60
Unclassified report

Descriptors: (*Radio interference, Radio communication systems), (*Model theory, Radio relay systems), Diversity reception, Radio transmission, Ultrahigh frequency

The communication performance in the presence of manmade interference of a multiple terminal, diversity augmented, vehicular, radio relay communication system dispersed throughout a large geographical area has been studied by computer modeling of the multinode system. The radio relay system operating at UHF in the presence of unintentionally generated manmade radio noise has been evaluated from the viewpoint of message propagation rate and completeness of coverage for varying relay point distributions. The communication performance for several distributions of mobile relays dispersed in a specified operational area of western Europe was examined under the influence of manmade UHF noise generated by 52 urban industrial centers in the region. The effectiveness of message repetition in overcoming the adverse effect of intense manmade noise was measured as a function of relay point density. (Author)

AD-629 246 See Fld. 9/1

AD-629 728 See Fld. 20/14

17/3. DIRECTION FINDING

AD-629 365 See Fld. 18/3

17/6. MAGNETIC DETECTION

AD-629 104 Fld. 17/6, 20/3
CFSTI Prices: HC $2.00 MF $0.50
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
FEASIBILITY OF USING ELECTROSTATIC METHODS TO DETECT MOTION OF HUMAN BEINGS OR OTHER NEARBY OBJECTS.
Memorandum rept., 4 Jun-20 Aug 65,
by Jay Kirschenbaum. Oct 65, 32p. Rept. no. MR-M66-10-1,
Proj. DA-1L013001A91A
Unclassified report

Descriptors: (*Electrostatics, Detection), (*Detection, Electrostatics), (*Humans, Detection), State-of-the-art reviews, Capacitance, Inductance, Resistance (Electrical), Feasibility studies, Circuits, Capacitors, Interference, Measurement, Electric fields

It is known that the approach of a metallic object in the vicinity of a resonating LRC (inductance-resistance-capacitance) circuit will change the resonant frequency and 'Q' value of the circuit somewhat as new 'boundary' conditions are set up near the capacitance and induction of the circuit. For very close approaches, these changes are detectable as fluctuations in current, voltage, and dissipated power in the circuit. Thus, in a sense, the LRC circuit serves as a detector of the metallic object. Based on the above, an investigation has been carried out to study the feasibility of using electrostatic methods to detect the motion of objects, particulary human beings. Three main approaches to the problem have been studied. The first approach - a literature search - produced four devices whose basic principles of operation could possibly be applied to the measurement of capacitances in the ranges calculated. The second approach - an investigation of the feasibility of detecting changes in the earth's natural potential gradients produced by moving objects. The third approach - an investigation of the possibility of detecting the induced transient currents which flow in an RC circuit in reaction to the motion of nearby objects - produced interesting results. It is concluded that a short range detection system using electrostatic methods is feasible. (Author)

AD-629 365 See Fld. 18/3

17/7. NAVIGATION AND GUIDANCE

AD-629 424 Fld. 17/7
CFSTI Prices: HC $8.40 MF $2.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THEORY OF GYROSCOPIC DEVICES, PART II, CHAPTERS 7-11,
by S. S. Rivkin. 30 Dec 65, 539p. Rept. no. FTD-MT-65-96,
TT 66-60726
Unclassified report

Edited machine trans. of mono. Teoriya Giroskopicheskikh Ustroistv, Chast' II, Leningrad, 1964 p1-548.

Descriptors: (*Gyroscopes, Theory), Gyro stabilizers, Gyro compasses, Inertial navigation, Instrumentation, Tachometers, Accelerometers, USSR

This book is the second part of a work on the theory of gyroscopic devices (GD's) (the first part was published in 1962). In it the theory of active-type gyroscopic stabilizers, differentiating and integrating gyroscopes, gyroscopic navigational systems, and also certain questions of gyroscopic stabilization are considered. Basic attention is allotted to determination of dynamic errors of GD's in conditions of random controls and disturbances. The book is intended for engineeringtechnical and scientific workers, studying questions of applied gyroscopy, and can serve as a training aid for students and post graduates, studying the theory of GD's. (Author)

AD-629 583 Fld. 17/7, 4/1, 22/2
CFSTI Prices: HC $8.60 MF $0.75
EWEN KNIGHT CORP EAST NATICK MASS
MOLECULAR ATMOSPHERIC OXYGEN HORIZON STUDY RADIOMETRIC MEASUREMENT INSTRUMENT.
Final rept., Sep 63-Nov 65,
by H. P. Taylor, and J. A. Campbell. Nov 65, 82p. Rept. no. 1093,
Contract AF 19 (628)-3239, Proj. AF-4427, Task 442702,
AFCRL 65-912
Unclassified report

Descriptors: (*Radiometers, Horizon scanners), (*Horizon scanners, Thermal radiation), (*Space navigation, Radiometers), (*Oxygen, Thermal radiation), Space guidance, Satellites (Artificial), Attitude control systems, Vertical indicators, Atmospheric temperature, Molecular properties, Microwave frequency, Feasibility studies

Previous calculations show that due to the heavy adsorption of the atmospheric oxygen, the resultant radiation both in the wells and in the cores of the 60 Gc/s spectral complex provides a radiometrically bright mantle surrounding the earth. When viewed from space, this oxygen mantle could supply a uniform nonfluctuating signal for radiometric vertical sensing. This possibility of utilizing the thermal properties of the earth's oxygen mantle as a reference for earth vertical sensing from satellite vehicles provided the primary stimulus for the radiometric development program reported on herein. One of the primary problems in defining the performance of a local vertical sensor is that there is no good absolute reference that can be used to determine the sensor error. Thus, where the vertical stability of the satellite is not well enough known to evaluate the performance of a vertical indicator, it is necessary to resort to a more indirect means. By the use of a relatively narrow antenna beam looking vertically downward, the temperature distribution of the oxygen mantlle as a function of latitude on the earth's surface can be determined. (Author)

AD-629 609 Fld. 17/7
CFSTI Prices: HC $4.00 MF $1.00
NAVAL WARFARE RESEARCH CENTER STANFORD RESEARCH INST MENLO PARK CALIF
MATHEMATICAL CONSIDERATIONS PERTAINING TO THE ACCURACY OF POSITION LOCATION AND NAVIGATION SYSTEMS.
Research memo.,
by W. Allan Burt, David J. Kaplan, Richard R. Keenly, John F. Reeves, and Francis B. Shaffer.
Nov 65, 121p. Rept. no. NWRC-RM-34,
Contract Nonr-2332 (00), Proj. SRI-2167-311,
Unclassified report

Descriptors: (*Position finding, Mathematical analysis), (*Navigation, Errors), Probability

The general case of the location of a point at the intersection of two lines-of-position involves different errors associated with each line. Also the general angle of intersection is other than 90 degrees. The distribution of error about such a point is an ellipse. A method of analysis has been developed to convert this genral case to the more readily handled case of two different standard deviations along the major and minor axes of the error ellipse. Nomograms and graphs are given to facilitate computation of error probabilities. Curves are shown to indicate the geometrical magnification of error as the intersection angle departs from 90 degrees. In addition the development is shown of a total error ellipse resulting from the combination from several randomly oriented error ellipses representing error components. Numerical examples are given. Derivations of all formulas shown are given in the appendixes. (Author)

AD-629 006 See Fld. 10/2

AD-629 568 See Fld. 20/11

17/8. OPTICAL DETECTION

AD-628 991 Fld. 17/8, 17/2, 13/10
CFSTI Prices: HC $8.60 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
SUBMARINE ILLUMINATION AND TELEVISION IN HARBOR WATER.
Final technical rept., Apr 63-Jun 65,
by R. D. Hitchcock. Feb 66, 87p. Rept. no. TR-R-432,
Proj. Y-F015-10-03-401,
Unclassified report

Descriptors: (*Television equipment, Submarines), (*Submarines, Television equipment), (*Underwater object locators, Television equipment), (*Harbors, Underwater object locators), Detection, Visibility, Illumination, Lighting equipment, Optical filters, Submarines, Optical detection

A submersible closed-circuit television system was used to conduct a quantitative study of submarine illumination and vision in harbor water. The television camera is attached to a spread-U structure which holds a target jig and a pair of incandescent-light assemblies. The light assemblies are equipped with remotely controllable polarizers and employ 1,000-watt quartz-iodide lamps. Observations of various types of targets were made during daylight hours and at night. The effects of color filtering, polarization filtering, and off-axis illumination on detection range and resolution for the vidicon TV camera were determined. Theoretical calculations were confirmed. In harbor water with an attenuation length around 5 feet, color or polarization filtering provides no improvement in contrast or resolution. The seeing range for a vidicon camera, in this type of water, is generally less than 10 feet. The best resolution obtainable was 1/4 inch at 8.7 feet. A history and analysis of the performance of the underwater television system is included. Results are given of an experimental study of methods of constructing underwater lamp assemblies using tungsten-iodide bulbs. (Author)

AD-629 452 Fld. 17/8
CFSTI Prices: HC $1.10 MF $0.50
HUMAN ENGINEERING LABS ABERDEEN PROVING GROUND MD
HUMAN FACTORS RESEARCH ON AIRCRAFT ARMAMENT.
Technical note.
Nov 63, 9p. Rept. no. TN-9-63,
Unclassified report

Descriptors: (*Targets, Detection), (*Target acquisition, Aircraft), (*Tracking systems, Aerial targets), Armament, Design, Visual perception, Identification, Helicopters

Research was conducted in the areas of aircraft and helicopter detection and acquisition by ground observers, and detection and acquisition of ground targets by observers flying in helicopters. The report represents a summary and compilation of the data derived from these studies.

AD-629 170 See Fld. 20/5

AD-629 624 See Fld. 6/16

17/9. RADAR DETECTION

AD-629 359 Fld. 17/9, 12/1, 4/1
CFSTI Prices: HC $10.60 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
STATISTICAL METHODS FOR THE ANALYSIS OF RE-ENTRY VEHICLE RADAR DATA, PART I.
Technical note,
by L. A. Gardner,Jr.. 13 Jan 66, 102p. Rept. no. TN-1966-5-Pt-,
Contract AF 19(628)-5167, Proj. AF-627A,
ESD TDR-66-11
Unclassified report

Descriptors: (*Statistical analysis, Radar tracking), (*Radar tracking, Atmosphere entry), (*Radar echo areas, Reentry vehicles), Wake, Doppler radar

This report treats the theoretical problem of joint estimation of the wake and hard body cross sections (the parameters of the Rice distribution) from either incoherent or coherent radar data. (Author)

AD-629 363 Fld. 17/9, 9/5
CFSTI Prices: HC $34.20 MF $1.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
PHASED ARRAY RADAR STUDIES, 1 JANUARY 1963 TO 1 JULY 1964.
Technical rept.,
by J. L. Allen, D. M. Bernella, F. Betts, L. Cartledge, and W. P. Delaney. 31 Mar 65, 346p.
Rept. no. TR-381,
Contract AF 19(628)-500, Proj. AF-649L,
ESD TDR-65-66
Unclassified report

Descriptors: (*Phased arrays, Radar), (*Radar, Phased arrays), Antenna arrays, Radar transmitters, Phase shifters, Resolution, Radar targets, S band, Multiple beam antennas, Bandwidth, Narrowband, Broadband, Time-delay relays, Tunnel diodes, Amplifiers, Antenna feeds

The report is the fourth in the series of reports describing the work of a general research nature carried out by the Lincoln Laboratory Array Radars Group. The effort reported is directed toward an investigation of components, techniques, and fundamental theoretical limitations of arrays, primarily for high-power radar applications. The emphasis is on those applications which place the most stringent demands on the radar for resolution of very small targets from backgrounds of extensive and relatively large clutter (arrays with capability for high power, broad bandwidth, and narrow beamwidth). Part I deals with the concluding activities on the 900-Mcps test array, emphasizing the configuration of the transmitting array and our experiences with it. Part II is devoted to work on an S-band subarray transmitter configured around the use of high-power helical phase shifters. Part III deals with theoretical and experimental studies in multiple-beam-forming systems and studies in mutual-coupling effects. (Author)

AD-629 454 Fld. 17/9, 14/2, 9/5
CFSTI Prices: HC $4.00 MF $1.00
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
MEASUREMENT OF ELECTRICAL PROPERTIES OF HIGH TEMPERATURE RADOME MATERIALS BY MEANS OF THE XB 3000A DIELECTROMETER.
Master's thesis,
by Glen H. Sage. Nov 65, 140p. Rept. no. GE/EE/65-21,
Unclassified report

Descriptors: (*Radomes, Electrical properties), (*Test equipment, Radomes), Spacecraft, Antennas, Protective coverings, Refractory materials, Dielectric properties, Measurement, Theory, Mathematical analysis, High-temperature research, Materials

The XB 3000A dielectrometer is an instrument used to measure the dielectric constant and loss tangent of radome materials up to a temperature of 3000F. In the report a set of operational procedures and techniques necessary to achieve measurements which are comparable with published data is described. The theory and mathematical development of the method of determining the dielectric constant and loss tangent from preise measurements is shown. Sources of errors and their affect on the overall instrument accuracy are discussed. Extensive tests were carried out on the determination of the dielectric constant and loss tangent for several materials at elevated temperatures. The accuracy to which the dielectric constant and loss tangent may be obtained is determined by means of comparing data realized with standard published data for a sample of Corning 9606. Results indicate that the dielectric constant can be determined to a nominal limiting error of 1.0% and loss tangent to a nominal accuracy of 0.0008. (Author)

AD-629 601 Fld. 17/9, 9/1
CFSTI Prices: HC $3.00 MF $0.75
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
MICROMINIATURIZED MTI GROUP AN/GPA (XW-2).
Final rept. Apr 64-Aug 65,
by William L. Cappadona. Mar 66, 51p. Rept. no. AIL-3453-1,
Contract AF 30 (602)-3358, Proj. AF-4506,
Task 450601,
RADC TR-65-442
Unclassified report

Descriptors: (*Moving target indicators, Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Radar equipment, Films, Integrated circuits, Radar clutter, Range gating, Band-pass filters, Signal-to-noise ratio, Modules, Electronic

An engineering model of MTI Group AN/GPA (XW-2) was constructed that demonstrates the feasibility of manufacturing thin-film and monolithic canceler circuits with electrical characteristics and reliability in excess of tube or transistorized equipment. The model is 54 cubic inches in volume compared with a transistorized version of 1,296 cubic inches. The MTI group uses a non-real-time clutter filter (range-gated filter) approach whereas the transistor version uses a real-time filter (delay line). There are 100 range gated filter modules, each providing a 1/2-mile MTI range increment. These modules are of hybrid construction; monolithic integrated chips connected to each other on a thin-film substrate. The MTI group operates satisfactorily over a temperature range from 0 to +72C. The design and construction is such that a cancellation ratio and subclutter visibility of 45 db can be easily obtained. Experiments with this unit show the definite feasibility of manufacturing microminiature canceler equipment. (Author)

AD-629 722 Fld. 17/9
CFSTI Prices: HC $2.00 MF $0.50
NAVAL ORDNANCE LAB CORONA CALIF
MICROWAVE RADIOMETRY AND THE NOLC X-BAND RADIOMETER PROGRAM,
by J. O. Hooper. 1 Feb 66, 36p. Rept. no. NOLC-641,
Task RMWC-42-123/211-1/F008-02-07,
Unclassified report

Descriptors: (*Radiometers, Microwaves), (*Microwaves, Radiometers), X band, Microwave equipment, Metals, Detection, Coatings, Theory, Targets, Thermal properties, Noise (Radar), Concrete, Wood, Asphalt

The microwave radiometric project at NOLC consists of theoretical studies and measurements using an X-band radiometer. System parameters and operating procedures are discussed in addition to theoretical considerations of microwave radiome-

try. The radiometer is presented as a linear system that can be defined mathematically by well-known transform techniques. A scanning microwave pencil-beam antenna is analyzed as a low-pass filter of spatial frequencies, and the effects of finite antenna beams on mapping radiometers is discussed. Examples of radiometric temperature contrasts obtained with various targets are reported, and the effects of some target coverings on the radiometric temperature of targets are considered. (Author)

AD-628 967 See Fld. 4/2

AD-629 267 See Fld. 20/12

AD-629 468 See Fld. 9/5

17/10. SEISMIC DETECTION

AD-628 901 See Fld. 8/11

AD-628 933 See Fld. 8/11

AD-629 431 See Fld. 8/11

AD-629 739 See Fld. 8/11

Field 18-NUCLEAR SCIENCE AND TECHNOLOGY

18/3. NUCLEAR EXPLOSIONS

AD-629 357 Fld. 18/3, 6/18
CFSTI Prices: HC $3.00 MF $0.75
PUBLIC HEALTH SERVICE LAS VEGAS NEV
OFF-SITE SURVEILLANCE.
Final rept.
4 Feb 66, 60p.
ARPA VUF-1021

Unclassified report

Rept. on Proj. DRIBBLE, Salmon Event, Tatum Salt Dome, Miss., 22 Oct 64.

Descriptors: (*Nuclear explosions, Radiation measurement systems), (*Health physics, Underground explosions), (*Evacuation, Management planning), Population, Radiological contamination, Explosion effects, Attitudes, Public opinion, Sampling, Milk, Air

The most significant knowledge gained during the Salmon Event was that large numbers people can be successfully evacuated, and a comprehensive off-site radiological safety program can be successfully conducted in a populated area if the confidence of the people toward the operation is maintained. Considering the many occasions that the people were contacted relative to the surveys of the area and evacuation activities, extreme precautions were necessary to maintain the confidence of the people. In developing evacuation procedures, it was learned that each family had to be considered on an individual basis, and that questions relative to the operation had to be answered truthfully and as precisely as possible. The people in the area expressed considerable concern relative to when the shot would be detonated and what the effects might be on them and their surroundings. They expressed major concern over possible damage to their water wells due to structural or radiological effects. (Author)

AD-629 365 Fld. 18/3, 17/6, 17/3
NATIONAL BUREAU OF STANDARDS BOULDER COLO
TECHNIQUES FOR DETECTION OF HIGH-ALTITUDE NUCLEAR EXPLOSIONS,
by A. G. Jean, C. E. Hornback, R. H. Doherty, J. R. Winkelman, and R. T. Moore. 14 Oct 65, 12p. Contract ARPA Order-183,

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p2088-98 Dec 1965. Copies to DDC users only.

Descriptors: (*Nuclear explosions, High altitude), (*Detection, Nuclear explosions), Geophysics, Explosion effects, Spectrum signaturer, Radiofrequency, Electromagnetic pulses

The Central Radio Propagation Laboratory (CRPL) is conducting a study for the Advanced Research Projects Agency (ARPA), Project VELA, of ground-based techniques for detecting geophysical effects produced by nuclear explosions at altitudes above about 20 km and in space. This activity has been designated HANDS, an abbreviation for High-Altitude Nuclear Detection Studies. A substantial amount of experimental data exists on effects produced by high-altitude explosions and theoretical predictions have been made of effects expected from explosions in space. The ability to record and identify these signatures is limited by a lack of knowledge of natural variations, especially those having fractional-second onset times. The objective of the HANDS is to develop methods for detecting nuclear explosion effects in the natural background. The experimental facility for collecting and processing background data from a collection of colocated geophysical sensors is described. (Author)

AD-629 404 Fld. 18/3
CFSTI Prices: HC $3.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
PULSED REACTOR SIMULATION OF UNDERWATER NUCLEAR DETONATIONS-THERMAL ANALYSIS,
by V. E. Schrock. 9 Apr 65, 33p. Rept. no. USNRDL-TR-940,
Contract AT (49-5)-2084,

Unclassified report

Descriptors: (*Nuclear explosions, Simulation), (*Underwater explosions, Nuclear explosions), (*Thermochemistry, Nuclear explosions), Feasibility studies, High temperature research, Uranium, Fission products

Pulsed reactor facilities provide, in a short time interval, a copious supply of neutrons which can be used in small-scale experiments to simulate some of the aspects of underwater nuclear detonations. Calculations have been made, using reasonable approximations, to estimate the degree of vaporization, if any, which would result when a small U-235 sphere is irradiated in a pulsed reactor facility. Conditions considered were a 10-mg sphere immersed in water (and in vacuum) and irradiated with a reactor period of 2 ms, resulting in a total fission energy deposition of 16 calories (2 x 10 to the 12th power fissions). Results of these calculations indicate complete vaporization of the U-235 bead in a vacuum environment, with a peak temperature of between 13,900 and 28,800K. This temperature is limited by expansion, radiation heat loss, and condensation of U-235 on the walls of the vacuum vessel. In the water environment, the bead would be vaporized, with peak temperature above 7000K, resulting in complete chemical reaction with water vapor and the release of an additional 5.1 calories of heat. Again, radiation, condensation and expansion limit the temperature. The final state of fuel and fission products is expected to be finely divided oxides suspended in liquid water, if not free molecules. Hydrogen will be generated (1.9 ml at STP). (Author)

AD-629 407 Fld. 18/3, 8/8, 18/8
CFSTI Prices: HC $3.00 MF $0.50
HAZLETON-NUCLEAR SCIENCE CORP PALO ALTO CALIF EARTH SCIENCES DIV
POST-SHOT HYDROLOGIC SAFETY.
Final rept.
30 Oct 65, 50p. Contract AT (29-2)-1229, ARPA VUF-1014

Unclassified repo

Report on Proj. SHOAL, Fallon, Nevada, October 26, 1963.

Descriptors: (*Nuclear explosions, Underground explosions), (*Hydrology, Radiological contamination), (*Radiological contamination, Hydrology), Nevada, Test facilities, Radiation hazards, Underground, Water, Safety, Structural geology

The Shoal Event, a 12.5 KT nuclear detonation one in a series of tests in the Vela Uniform Program, occurred at 1000 hours PST on October 26 1963, in the granite of the Sand Springs Range about 45 kilometers southest of Fallon, Nevada The Sand Springs Range trends northsouth and comprises jointed, faulted, and fault-bounded me tamorphosed Paleozoic and Mesozoic marine sediments with a central granitic intrusive body. Alluvial-filled valleys, Fairview Valley and Fourmile Flat, are east and west of the Range, respectively The alluvial fill in the valley contains and transmits appreciable quantities of ground water. Some ground water occurs in the granite and other crystalline rocks of the Range; however, this amount is small and movement is slow. Re-entry drilling and Hydyme results indicate that the Shoal device detonated as predicted and a rubble chimney 2 meters in radius and 108.5 meters high was formed by the explosion. Significant quantities of radionuclides were produced at Shoal; however, nuclides in ground-water solution are not free to move from the rubble chimney region until aquifer stabilization is achieved and the chimney fills with ground water. (Author)

AD-628 893 See Fld. 4/1

AD-628 970 See Fld. 18/8

AD-628 982 See Fld. 18/8

18/4. NUCLEAR INSTRUMENTATION

AD-629 059 Fld. 18/4, 20/3
CFSTI Prices: HC $1.00 MF $0.50
ATOMICS INTERNATIONAL CANOGA PARK CALIF
SUPERCONDUCTING NUCLEAR PARTICLE DETECTOR.
Quarterly progress rept., 15 Aug-31 Dec 65,
by D. E. Spiel. 31 Dec 65, 25p. Contract DA-18-035-AMC-107 (A)

Unclassified report

Descriptors: (*Alpha particle detectors, Superconductors), (*Superconductors, Alpha particle detectors), Radiation measurement systems, Films, Superconductivity, Pulse counters, Voltage, Signal-to-noise ratio

The mechanisms involved in the detection of alpha particles by thin superconducting films have been further examined. In particular, the alpha-particle induced, self-recovering, voltage pulses were studied in some detail. Experimentally, the problem of obtaining useful information from these pulses is difficult because the signal-to-noise ratio is poor and the pulses are very fast. Attempts were made to increase pulse amplitudes by increasing film resistivity, but although some success was achieved, the increases were not adequate to significantly relieve the problem. Critical currents were increased in several films by placing ground planes over the detectors, but this increase did not result in enhanced pulses. The ground plane experiments did show, however, that thermal spike radii measurements are insensitive to the inhomogeneous current distributions which exist in films without ground planes. The distribution of pulse amplitudes with and without ground planes was measured and found to be very broad in both cases. The problem of theoretically describing the pulses is

complex, since a multitude of dynamic features must be considered. (Author)

AD-629 511 Fld. 18/4
CFSTI Prices: HC $2.00 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
DESIGN CRITERIA FOR WIDE RANGE GAMMA RADIACS USING SEMICONDUCTOR DIODE DETECTORS,
by W. F. Wesley, and Joseph. 8 Feb 66, 35p.
Rept. no. USNRDL-TR-975,
Proj. SF-011-05-04, Task 6192,
Unclassified report

Descriptors: (*Gamma counters, Semiconductor devices), (*Dosimeters, Semiconductor devices), (*Semiconductor devices, Detectors), (*Health physics instrumentation, Gamma counters), Design, Diodes (Semiconductor), Silicon, Photons, Amplifiers, Noise

The report covers the application of silicon semiconductor detectors to a wide-range, gamma-ray doserate meter using the detectors in a pulse counting mode. It reviews pertinent circuit and detector characteristics that establish the doserate ranges that can be covered, the energy dependence to be expected from both large lithium-drifted detectors and very small silicon junction diodes, and finally the stability requirements imposed on the electronics by the pulse mode of operation. Methods of tailoring the photon energy response of semiconductor detectors are reviewed. Particular attention is given to the effect on design of amplifier and detector noise and variations in the noise level. One example of a combination of detectors to cover the doserate range from 0.2 mR/h to 2000 R/h is shown. The report supports the conclusion that it is practical to make a survey meter, using silicon semiconductor detectors, that covers both the health physics and high doserate ranges of interest in military radiac design. (Author)

AD-629 545 Fld. 18/4
CFSTI Prices: HC $8.60 MF $0.75
SIGNAL CORPS ENGINEERING LABS, FORT MONMOUTH N J
EVALUATION OF MILITARY RADIAC EQUIPMENT,
by Joseph M. Johnston, and George Poyet. Jun 54, 85p.
AEC WT-755
Unclassified report

Rept. on Operation Upshot-Knothole, Nevada Proving Ground, March-June 1953, Project 6.8. Prepared in cooperation with the Bureau of Ships.

Descriptors: (*Radiation measurement systems, Tests), (*Dosimeters, Tests), Model tests, Reliability

Two production type and several experimental type survey meters were evaluated. The AN/PDR-32 (XN-3) service test model and the IM-71/PD prototype model were subjected to similar field tests. Certain basic problems existed with each. The AN/PDR-32 gave unreliable readings at rates above 300 r/hr, due to sporadic effects, and the IM-71 was unreliable due to its annoying drift and inability to be reset in high radiation fields. The recommendations contained herein should be effected prior to the approval of either equipment for service use. A number of dosimeters of various types were tested, both of a tactical and administrative nature. Among the tactical dosimeters tested on this project, the DT-65 showed the most promise. However, if some difficulties with rate dependence and pressure sensitivity are rectified in the IM-91, this instrument would have first preference. Administrative type dosimeter DT-60 fulfills the requirements for a dosimeter of this type. The E-1 Tactical, Tracerlab Tactical and the Consolidated Vacuum dosimeters were tested under Project 6.4 and reported on in WT-753. In view of limited data contained in this report concerning dosimeter accuracy in residual fields, it is recommended that future dosimeter evaluation programs include a comprehensive analysis of dosimeter response to residual radiation. (Author)

AD-629 058 **See Fld. 20/12**

AD-629 721 **See Fld. 4/1**

18/5. NUCLEAR POWER PLANTS

AD-629 709 Fld. 18/5, 20/12
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
USE OF MOS TRANSISTORS IN SOLID-STATE RADIATION SURVEY METERS.
Technical rept.,
by Richard Brayden, Dennis Bowman, and Luke McSherry. Feb 66, 13p. Proj. DA-1P6-22001-A056, Task 1P6-22001-A-056-01,
ECOM 2661
Unclassified report

Descriptors: (*Radiation measurement systems, Transistors), (*Transistors, Radiation measurement systems), (*Semiconductors, Radiation measurement systems), Solid state physics, Circuits, Oxides, Semiconductor devices

An all solid-state survey meter using an MOS transistor instead of an electrometer tube was designed and constructed. The survey meter, using one high-megohm resistor had two scale ranges: 500 mr/hr and 50 mr/hr. Additional scale ranges could be obtained using additional high-megohm resistors. As a result of the work it is apparent that an all solid-state survey meter offers distinct advantages over present-day tube models. Low cost, reliability, and compactness are a few of the major features. In addition, it is seen that it will be possible to integrate the entire circuit on a single chip and encase it in a single header for additional size decrease. (Author)

AD-629 562 **See Fld. 10/2**

18/6. RADIATION SHIELDING AND PROTECTION

AD-629 180 Fld. 18/6
CFSTI Prices: HC $12.60 MF $1.00
TECHNICAL OPERATIONS INC BURLINGTON MASS
STRUCTURE SHIELDING FROM SIMULATED FALLOUT GAMMA RADIATION.
Final rept., phase 1,
by A. L. Kaplan, J. Waldman, J. L. Jones, W. E. Barchand , and R. L. MacNeil. Nov 65, 126p.
Rept. no. TO-B-65-27,
Contract N228 (62479)65776,
Unclassified report

Descriptors: (*Structures, Shielding), (*Shielding, Structures), (*Gamma rays, Radioactive fallout), Simulation, Theory, Experimental data, Floors, Radiation effects, Steel, Rectangular bodies, Cylindrical bodies, Walls, Cobalt, Radioactive isotopes

Experiments were performed to evaluate the application of the presently-used structure shielding theory to structures of simple geometry. The shape factor verification experiments yielded results which the theory predicted to within 15%. For the interior partitions experiments, the theory predicted the experimental results to within 10% in most cases and 20% in all cases. For the structures with outer-wall apertures and no interior partitions, theory and experiment agree to within 15%. Introduction of the interior partition, however, causes theoretical predictions to be up to 50% lower than experimental results at detector locations opposite the aperture, apparently caused by the failure of the theory to account for radiation scattering effects by the interior partition. The results of the basement shielding experiments showed good agreement between theory and experiment for structures with no floor. However, the theory was a factor of 3 lower than the experimental results for structures with a 1/2-in. (20 psf) steel floor, indicating the requirement for a change in the floor barrier reduction factor currently used in the theory. (Author)

AD-629 217 Fld. 18/6
CFSTI Prices: HC $1.60 MF $0.50
TECHNICAL OPERATIONS INC BURLINGTON MASS
STRUCTURE SHIELDING FROM SIMULATED FALLOUT GAMMA RADIATION.
Final summary rept. (Phase 1).
Nov 65, 12p. Rept. no. TO-B-65-27,
Contract N228- (62479)-65776),
Unclassified report

See also AD-629 180.

Descriptors: (*Structures, Shielding), (*Shielding, Structures), (*Gamma rays, Radioactive fallout), Simulation, Theory, Experimental data, Floors, Radiation effects, Steel, Rectangular bodies, Cylindrical bodies, Walls, Cobalt, Radioactive isotopes

AD-629 607 Fld. 18/6, 14/2
CFSTI Prices: HC $6.00 MF $1.25
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
SIMULATION DEVICES FOR USE IN STUDIES OF PROTECTIVE CONSTRUCTION.
Technical rept., 1 Jan-31 Dec 65,
by James A. Mahoney. Feb 66, 225p. Rept. no. AFWL-TR-65-224,
Proj. AF-5710,
Unclassified report

Descriptors: (*Simulators, Nuclear explosions), (*Test equipment, Loading (Mechanics), (*Nuclear explosions, Loading (Mechanics)), Shock tubes, Shelters, Impact tests, Construction, Explosion effects, Simulation

The report contains information on dynamic loading simulation devices that were either designed or could be modified for use in studies of protective construction. The information includes the following items: (1) the type of device, (2) the owner and location, (3) the loading characteristics, (4) the physical description, (5) the driver used, and (6) a short discussion concerning the device and its present use. Pictures and diagrams are also furnished for the majority of the devices. (Author)

AD-629 421 **See Fld. 6/18**

18/8. RADIOACTIVITY

AD-628 970 Fld. 18/8, 18/3
PUBLIC HEALTH SERVICE WASHINGTON D C
RADIATION LEVELS ABOARD COMMERCIAL JET AIRCRAFT RESULTING FROM ATMOSPHERIC NUCLEAR WEAPONS TESTS, NOVEMBER 1961 - DECEMBER 1962,
by Donald J. Nelson. Dec 62, 11p.
Unclassified report

Availability: Published in Radiological Health Data, v4 n1 p373-81 Jan 1963. Copies to DDC users only.

Descriptors: (*Nuclear explosions, Air pollution), (*Commercial planes, Radiation hazards), Gamma rays, Beta particles, Dosimeters, Data, Maps

The report presents data and interpretation of radioactivity findings on commercial jet aircraft during periods of atmospheric nuclear weapons testing. The following data are reported for the period November 1961 through December 1962: film badge and pocket dosimeter measurements of ex-

ternal gamma radiation during commercial jet flights, determinations of gross beta activity and gamma emitters in cabin air, and surface radioactivity measurements by G-M survey meters and by filter paper swipes of contaminated aircraft surfaces. The program monitored the following categories of flights originating in and returning to the United States: (a) polar, a flight going through or near the arctic region; (b) equatorial, a flight continuing near or along the equator; (c) longitudinal, a flight toward or across the equator and stopping at various Central and South American cities; (d) latitudinal, which includes transcontinental and European flights. Not all monitoring measurements were made on all flight categories; hence, the nature and extent of the measurements are described separately in each section.

AD-628 982 Fld. 18/8, 20/8, 18/3
CFSTI Prices: HC $3.00 MF $0.75
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
GAMMA-RAY ENERGY PSEUDOSPECTRA FOR U235 FISSION PRODUCTS AND FOR VARIOUS TIMES AFTER FISSION,
by C. F. Ksanda, E. Laumets, and M. A. Hogan. 16 Dec 65, 99p. Rept. no. USNRDL-TR-942, Proj. SF-011-05-12, Task 0506,
Unclassified report

Descriptors: (*Uranium, Fission products), (*Fission products, Gamma-ray spectra), (*Gamma-ray spectra, Mathematical analysis), Nuclear explosions, Photons, Energy, Attenuation, Shielding, Air, Iron, Programming (Computers), Flow charting

The gamma-ray energy spectrum of U-235 fission products following a nuclear explosion is made up of hundreds of different photon energies whose relative contributions to the spectrum change with time after fission. Gammaradiation attenuation and shielding calculations can be greatly simplified by the use of 'pseudospectra' that closely approximate the attenuation obtained with the 'true' spectra. A technique for computing pseudospectra weighting fractions to obtain such simplified spectra composed of only 5 representative photon energies is described. Pseudospectra weighting fractions and pseudospectra for air and iron attenuation are presented. A flow chart and an IBM-704 computer program of the technique are also presented, along with the input data and examples of the printed output values. Throughout the time range considered (from 1.7 sec to 301 days after fission), the maximum attenuation error is less than plus or minus 5%. The technique is valid for resolving almost any spectral attenuation data into five or fewer energy components, and may be used to solve problems involving five simultaneous equations in five unknowns with prescribed constraints. (Author)

AD-629 002 Fld. 18/8, 12/2
CFSTI Prices: HC $5.00 MF $1.00
TECHNICAL OPERATIONS INC BURLINGTON MASS
DEVELOPMENT OF AN IMPROVED LAND-SURFACE FALLOUT MODEL.
Interim rept. no. 1, 1 Apr-31 Oct 65,
by H. G. Norment, T. W. Schwenke, and I. Kohlberg. Jan 66, 177p. Rept. no. TO-B-65-99, Contract DA-28-043-AMC-01309 (E), Proj. DA-1V0-14501-B-53A-01, Task NWER-10.058, ECOM TR-01309-1
Unclassified report

Descriptors: (*Radioactive fallout, Mathematical models), (*Mathematical models, Radioactive fallout), Mathematical prediction, Clouds, Dynamics, Wind, Programming (Computers), Operations research

A new concept in fallout models, the DOD Fallout Prediction System, is being designed and constructed to serve as a basis for the next generation of fallout prediction models. The model considers in detail the dynamics of cloud rise and growth and provides for fallout particle transport through a three-dimensional time variant atmosphere that includes analytical wind models of local circulation systems such as mountain winds and sea breezes. The model is being programmed for machine computation in a highly modular and flexible fashion to facilitate research usage of the program. Coding is being done exclusively in FORTRAN language. (Author)

AD-629 576 Fld. 18/8
CFSTI Prices: HC $4.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
LEVELS OF SR85 POPULATED IN THE DECAY OF Y85 AND Y85M,
by Daniel J. Horen, and W. H. Kelly. 18 Nov 65, 44p. Rept. no. USNRDL-TR-962, Proj. SR-011-01-01, Task 0401,
Unclassified report

Descriptors: (*Yttrium, Radioactive decay), (*Strontium, Nuclear energy levels), Isotopes, Half life, Isomeric transitions, Nuclear spins, Parity, Nuclear isomers, Photons, Positrons, Nuclei

Evidence is presented for the existence of two isomers in Y (85) with half-lives of 2.9 plus or minus 0.2-h and 4.7 plus or minus 0.2-h. Positron, photon and x-ray measurements, both singles and coincidence, were performed. No evidence was obtained for the existence of an isomeric transition between the two isomers. A tentative decay scheme for 2.9-h Y (85) is presented which includes levels in Sr (85) at 0.237 (Sr (85m), 1/2-), 0.740 (1/2-, 3/2-) and 1.152 (1/2-, 3/2-) MeV. A decay scheme for 4.7-h Y (85) is proposed with levels at 0.231 (7/2+), 0.769, (0.802), 1.263, 1.353, 1.556, 1.630, 2.118, 2.169, (2.329), 2.351 and 2.779 MeV. Consideration of the data suggests that 2.9-h Y (85) has spin and parity 1/2-, and lies approximately 0.040 MeV above 4.7-h Y (85) which has spin and parity 9/2+. The logft values suggest that most of the levels populated in the 4.7-h decay have spins and parities 7/2+, 9/2 or 11/2+, the latter being less preferred because of the photon branching ratios. Although additional experimental data are required to make possible a detailed comparison with the even parity level structure of Sr (85) as predicted by Talmi and Unna (Nucl. Phys. 19:225 (1960)), the apparent preponderance of levels with spins between 7/2 and 11/2 indicates one might expect poor agreement. (Author)

AD-629 121 **See Fld. 4/1**

AD-629 315 **See Fld. 4/1**

AD-629 407 **See Fld. 18/3**

AD-629 527 **See Fld. 4/2**

AD-629 672 **See Fld. 8/10**

Field 19-ORDNANCE

19/1. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-628 958 Fld. 19/1, 14/2
CFSTI Prices: HC $1.60 MF $0.50
PICATINNY ARSENAL DOVER N J
FRICTION PENDULUM.
Testing manual,
by J. H. McIvor. 8 May 50, 16p. Rept. no. PA-Manual-7-1,
Unclassified report

Descriptors: (*Explosive materials, Test methods), (*Test equipment, Explosive materials), Impact shock, Friction, Sensitivity, Design, Instruction manuals

The purpose of a Friction Pendulum Test is to determine the sensitivity of explosives when subjected to a glancing blow with its attendant friction. A test consists of ten trials with the steel shoe, except when complete explosion or burning occurs in any trial. If explosion or burning occurs, the trials with the steel shoe are discontinued. Ten trials are made with fiber faced shoe only when complete explosion or burning occurs with a steel shoe, or as prescribed in test directive. If the explosive passes the test with the use of the steel shoe, no further trials are conducted. From a viewpoint of economy and efficiency, therefore, all samples are tested first with the steel shoe. Each trial consists of 7 plus or minus 0.1 grams of explosive.

AD-629 037 Fld. 19/1
CFSTI Prices: HC $9.60 MF $0.75
PICATINNY ARSENAL DOVER N J PYROTECHNICS LAB
DEVELOPMENT OF COLOR MARKER HEADS FOR THE 2.75-INCH ROCKET.
Technical rept.,
by Bernd Kliem, J. E. Andrews, Jr., and G. P. Bessey. Feb 66, 74p.
PA TR-3316
Unclassified report

Descriptors: (*Rocket heads, Markers), (*Markers, Rocket heads), Folding fins (Rockets), Colored smokes, Dyes, Salts, Sodium compounds, Chlorides, Captive tests, Binders, Fatty acids, Experimental data, Firing test (Ordnance), Ballistics, Specifications

Development of the XM152 red marker warhead and XM153 yellow marker warhead for the 2.75 inch Folding Fin Aircraft Rocket (FFAR) was successfully accomplished in eight weeks. This report presents the results of static tests conducted at Picatinny Arsenal and ballistic tests at other installations during this program and in related investigations. (Author)

AD-629 196 Fld. 19/1, 20/14
CFSTI Prices: HC $2.60 MF $0.50
NAVAL WEAPONS LAB DAHLGREN VA
HERO TEST PROGRAM FOR WEAPON DEVELOPERS. PART I. DEVELOPMENT OF SHIELDING EFFECTIVENESS TESTS.
Technical memo.,
by J. R. Pollard. Jan 66, 29p. Rept. no. W-3/66,
Unclassified report

Descriptors: (*Explosive initiators, Electromagnetic waves), (*Ordnance, Electromagnetic shielding), (*Electromagnetic shielding, Effectiveness), Test methods, Design, Weapons, Hazards

The development of a test program has been divided into four parts: (1) shielding effectiveness tests (0.1-30 MHz), (2) filter effectiveness tests, (3) shielding effectiveness tests (radar frequencies), and (4) other tests as required. This memorandum is a summary of the results of part (1) of the test program development. Included is a summary of research conducted to establish tests and to verify that these tests did provide meaningful results. In addition, recommended test procedures and equipment are discussed along with acceptability criteria for shielding effectiveness.

AD-629 224 Fld. 19/1, 20/14
CFSTI Prices: HC $2.60 MF $0.50
NAVAL WEAPONS LAB DAHLGREN VA
ON THE INFLUENCE OF REFLECTIONS FROM THE ENVIRONMENT ON HERO TEST RESULTS.
Technical memo.,
by J. H. Richter, R. W. Carson, and F. Smith. Feb 66, 24p. Rept. no. w-6/66,
Unclassified report

Descriptors: (*Explosive initiators, Hazards), (*Electromagnetic waves, Explosive initiators), (*Ordnance, Hazards), Electromagnetic wave reflections, Environmental tests, Simulation, Shipborne, Test method, Electromagnetic shielding

The study to estimate the degree of hazard to ordnance caused by electromagnetic radiation is being approached through a series of research tests designed to identify the significant variables and their interactions. This paper is concerned with a study of the effect of reflecting objects surrounding the weapon system on the current induced in the ordnance's electroexplosive devices (EEDs). In a shipboard environment, many objects reflect electromagnetic radiation; e.g., superstructure, aircraft, vehicles and equipment. The simulated shipboard environments (NWL 'Ground Planes'), which are used for Hazards of Electromagnetic Radiation to Ordnance (HERO) testing, include metallic transmitter vans that are reflecting objects. The transmitter vans were used in this study as typical reflecting objects to estimate the effect of reflections.

AD-629 456 Fld. 19/1
CFSTI Prices: HC $3.60 MF $0.50
FRANKFORD ARSENAL PHILADELPHIA PA COMPONENTS ENGINEERING DIRECTORATE
MECHANICAL DELAY ARMING DEVICE FOR OFF CENTER SPIN APPLICATION.
Memo. rept.,
by Oscar W. Ehrman,Jr.. Jul 65, 38p. Proj. DA-1-N-542718-D-387,
FA M66-4-1

Unclassified report

Descriptors: (*Arming devices, Timing devices), (*Projectiles, Arming devices), Feasibility studies, Delay elements (Explosive)

A study was conducted to determine the feasibility of employing a mechanical timer in a spin environment when all components are mounted off the axis of rotation. It is necessary, for practical purposes, to consider a range of spin radii and speed, so for this study the upper design limits were 2.5 inches and 16,000 rpm. Results of this study indicate that the device designed for this program will operate in the required environment, but additional effort is necessary to establish timing accuracy and to eliminate deficiencies. (Author)

19/4. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-628 915 Fld. 19/4, 21/2
CFSTI Prices: HC $1.10 MF $0.50
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
GROWTH OF BURNING TO DETONATION IN LIQUIDS AND SOLIDS.
Annual summary rept. no. 8, Nov 64-65,
by F. P. Bowden. Nov 65, 8p. Contract AF-EOAR-24-65, Proj. AF-9711, Task 971101,
AFOSR 66-0406

Unclassified report

Descriptors: (*Explosions, Photographic analysis), (*Combustion, Explosive materials), (*Detonations, Photographic analysis), (*Fragmentation, Explosions), Liquids, Solids, Single crystals, Sensitivity, Fracture (Mechanics), Theory, Geometric forms, Highspeed photography, Great Britain

A high-speed photographic study was made of the initiation of explosive liquids (using sparks and impact) and of single crystals of explosive solids (using shock and hot wires). The physical homogeneity of the material was shown to have a marked effect on its sensitivity. Studies of the fracture of inert solids demonstrated the importance of geometry on the fragmentation process. Various branches of classical explosion theory were extended. (Author)

AD-628 984 Fld. 19/4
CFSTI Prices: HC $4.00 MF $1.00
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
CONTRIBUTION TO THE STUDY OF THE INITIATION OF DETONATION PRODUCED BY IMPACT ON AN EXPLOSIVE.
Technical translation, (Doctoral thesis),
by Henri Bernier. Feb 66, 128p. Rept. no. tt-9, TT 66-60680

Unclassified report

Trans. of Commissariat a l'Energie Atomique, Paris (France). Rapport nR2497 1964.

Descriptors: (*Explosive materials, Detonations), (*Detonations, Impact shock), (*Shock waves, Detonations), Hydrodynamics, Detonation waves, Deflagration, Reaction kinetics, Mathematical models, France, Solids

The initiation of detonation by impact on an explosive is described and discussed in detail. The differences in behavior of homogeneous and heterogeneous explosives are delineated and discussed. A mathematical model is proposed which provides results agreeing with the results of an experimental study of the generation of detonation in a solid granular explosive. A critical examination of various theoretical studies of the initiation of detonation by shock wave is included. (Author)

AD-628 989 Fld. 19/4
CFSTI Prices: HC $1.00 MF $0.50
POULTER LABS STANFORD RESEARCH INST MENLO PARK CALIF
DETONATION CHARACTERISTICS OF LOW-DENSITY GRANULAR MATERIALS.
Final technical rept., 1 Jan 62-31 Dec 65,
by Marjorie W. Evans. 3 Jan 66, 6p. Contract AF 49 (638)-1124, Proj. AF-9711 ,SRI-GHU-3928 Task 971101,
AFOSR 66-0326

Unclassified report

Descriptors: (*Explosive materials, Detonations), (*Detonation waves, Propagation), Particles, Ammonium compounds, Perchlorates, Shock waves, Sensitivity

A brief study is given of experimental and analytical research on the detonation characteristics of low-density granular materials, which was carried out with a view toward acquiring greater understanding of (1) The mechanisms of initiation of detonation, (2) The mechanisms of propagation of detonation and (3) The characteristics of initiating shocks and of the transient and steady waves. (Author)

AD-629 231 Fld. 19/4
CFSTI Prices: HC $2.00 MF $0.50
UTAH UNIV SALT LAKE CITY INST OF METALS AND EXPLOSIVES RESEARCH
ORIGIN OF DETONATION-GENERATED IONIZATION WAVES,
by Melvin A. Cook, and Dix A. Newell. 15 Sep 65, 36p. Contract AF-AFOSR-56-65, Proj. AF-9767, Task 976703,
AFOSR 65-1918

Unclassified report

Descriptors: (*RDX, Explosion effects), (*Gas ionization, Explosion effects), Detonation waves, Chemical reactions, Detonations, Sources, Propagation, Doping, Probes (Electromagnetic), Impurities, Nitrates, Potassium compounds, Cesium compounds, Plasma medium, Shock waves

The high electron density which exists in the external ionization wave that propagates away from the free surface of a detonating explosive was investigated by electrostatic probes and an impurity-doping method. Two impurities, potassium nitrate and cesium nitrate, were added to RDX in different molar concentrations. The conduction in the ionization wave was measured by the electrostatic probe technique. The increased maximum conduction at the front of the ionization wave and the increased thickness of the wave for doped RDX as compared with conduction measurements obtained with pure RDX were discussed in terms of two current models for the origin of the ionization wave - the shock wave model and the detonation generated plasma model. (Author)

AD-629 238 Fld. 19/4
CFSTI Prices: HC $2.00 MF $0.50
UTAH UNIV SALT LAKE CITY INST OF METALS AND EXPLOSIVES RESEARCH
DETONATION-GENERATED IONIZATION WAVES AT REDUCED PRESSURES.
Scientific rept.,
by Melvin A. Cook, and Dix A. Newell. 28 Sep 65, 42p. Contract AF-AFOSR-56-65, Proj. AF-9767, Task 976703,
AFOSR 65-2209

Unclassified report

Descriptors: (*RDX, Explosion effects), (*Gas ionization, Detonations), Pressure, Reduction, Probes (Electromagnetic), Velocity, Luminescence, Photography, Shock waves, Shock tubes, Electrical conductances, Detonation waves

Investigations were conducted into the phenomena accompanying detonation of RDX charges in constraining tubes at reduced air pressure. Electrostatic probe, and photomultiplier techniques were used to measure the conduction, luminosity, and velocity of the ionization wave which was expelled from the free surface of the explosive. Velocity data were also obtained for the detonation products. Color and infrared framing camera photographs of the ionization wave phenomena were obtained at different initial air pressures. The experimental results were compared with results reported of shock wave phenomena in shock tubes. (Author)

AD-629 239 Fld. 19/4
CFSTI Prices: HC $1.00 MF $0.50
UTAH UNIV SALT LAKE CITY INST OF METALS AND EXPLOSIVES RESEARCH
INFLUENCE OF ELECTRICAL FIELDS ON SHOCK OF DETONATION TRANSITION.
Scientific rept.,
by Melvin A. Cook, and Tim Z. Gwyther. 28 Sep 65, 15p. Contract AF-AFOSR-56-65, Proj. AF-9767, Task 976703,
AFOSR 65-2653

Unclassified report

Descriptors: (*Explosive materials, Detonations), (*Detonations, Electric fields), (*Electric fields, Detonations), Deflagration, Shock waves, Gas ionization, Detonation waves, Motion, Propagation

The prediction that one should be able to influence detonations in condensed explosives as well as gaseous ones by means of axial electric fields is studied by means of the deflagration to detonation transition (DDT) in a modified card gap (or SPHF plate) test by observing the influence of an applied field on the distance S2 into the receptor where the DDT occurs. This distance S2 for Composition B was shown to be appreciably influenced by an applied electrical field. The magnitude of the effect in 2 in. diameter cast Composition B (donor and receptor) and nearly a 5 cm lucite SPHF plate was about 0.15mm/KV/ cm, a positive to negative potential increasing the distance S2 and a negative to positive one decreasing S2 (unless the DDT occurs too close to an electrode). (Author)

AD-629 277 Fld. 19/4, 4/2
CFSTI Prices: HC $3.60 MF $0.50
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
BALLISTIC WINDS STUDY.
Quarterly rept. no. 2, 1 Sep-30 Nov 65,
by Frederick P. Ostby,Jr.. Mar 66, 36p. Contract DA-28-043-AMC-01377 (E)
ECOM 01377-2

Unclassified report

See also AD-623 836.

Descriptors: (*Weather forecasting, Military requirements), (*Wind, Exterior ballistics), (*Exterior ballistics, Wind), Meteorological parameters, Programming (Computers), Digital computers, Meteorology, Atmospheric sounding, Armed forces operations, Artillery units

Subjective analyses were made of ballistic winds at two-hourly intervals for five time periods over a region of southeastern Arizona in the vicinity of Ft. Huachuca. One procedure was to analyze the winds (integrated from the surface to 8000 meters) at the twelve observational sites without regard to the changing radiosonde locations during their flight. A second procedure was to account for the fact that the geographical coordinates of the observation are a function of height by plotting the meteorological information at the locations of the radiosonde for the various altitudes of interest. These analyses are presented and compared. Significant differences in ballistic wind occur when the horizontal gradients of the wind components are large and the radiosonde balloons are displaced a considerable distance. Modifications in a preprocessing computer program are being made to error check the basic meteorological data and make the necessary corrections. This program will put the data in a form suitable for the subsequent objective analysis programs. (Author)

AD-629 328 Fld. 19/4, 20/4, 14/2
CFSTI Prices: HC $6.60 MF $0.75
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
RESUME OF THE THEORY OF PLANE SHOCK AND ADIABATIC WAVES WITH APPLICATIONS TO THE THEORY OF THE SHOCK TUBE.
Technical note,
by C. W. Lampson. Mar 50, 65p. Rept. no. TN-139,
Proj. TB3-0112J
Unclassified report

Descriptors: (*Mechanical waves, Theory), (*Shock tubes, Theory), Shock waves, Equations of motion

The theory of plane shock and adiabatic waves is presented in an easily derived manner together with sufficient background material to enable the novice in the field to grasp the fundamentals required for further study. The application of the basic theory to the shock tube as a research instrument is given together with some experimental results to illustrate the calculations. Certain conceptions of energy and its relation to the impulse in a shock wave are presented in a manner not used in the literature. (Author)

AD-629 670 Fld. 19/4
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
NONLINEAR INTERACTION BETWEEN A SPHERICAL SHOCK WAVE AND FREE SURFACE WATER CAUSED BY THE EXPLOSION OF A DEEP CHARGE,
by B. I. Zaslavskii. 1966, 17p. Rept. no. Translation-2109,
TT 66-60742
Unclassified report

O Nelineinom Vzaimodeistvii Sfericheskoi Udarnoi Volny, Voznikshei v Resultate Vzryva Zaglublennogo Zaryada so Svobodnoi Poverkhnostyu Vody, trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n4 p57-65 1964.

Descriptors: (*Charges (Explosive), Explosion effects), (*Underwater explosions, Shock waves), (*Shock waves, Underwater explosions), Water, USSR, Equations

There was obtained a class of definite partial derivative solutions of 'short wave' equations.

AD-629 732 Fld. 19/4
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
DETONATION OF CONDENSED EXPLOSIVES WITH LOW CHARGE DENSITIES,
by L. N. Stesik, and N. S. Shvedova. 1966, 7p. Rept. no. translation-2111,
TT 66-60747
Unclassified report

Detonatsiya Kondensirovannykh Vzryvchatykh Veshchestv pri Malykh Plotnostyakh Zaryada, trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n4 p124-6 1964.

Descriptors: (*Detonations, Charges (Explosive)), (*Nitrocellulose, Density), Reaction kinetics, Equations of state, USSR, Condensation, Cellulosic plastics

An investigation was made of the relationship of the rates of detonation to the density of the explosive, using nitrocellulose (13.3% N2). The diameters of the charges varied from 20 to 30 mm. The charge casings were made of cellophane. The detonation rates were measured by optical methods using a high-speed photorecorder (SFR). From three to four measurements were made for each value of charge density. The average error of measurement did not exceed 1 - 2%. The lowest charge density value amounted to 0.13 g./cc. This is sufficiently close to the density values at which the detonation products obey the equation of state for ideal gases.

AD-628 936 **See Fld. 20/1**

AD-629 245 **See Fld. 7/4**

19/7. ROCKETS

AD-629 261 Fld. 19/7
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y
GODDARD PROBLEM WITH BOUNDED THRUST.
Revised ed.,
by H. Munick. 15 Mar 65, 5p. Contract AF 49 (638)-1207,
AFOSR 65-2331
Unclassified report

Revision of manuscript submitted 18 Sep 64.

Availability: Published in AIAA Journal v3 n7 p1283-5 Jul 1965. Copies to DDC users only.

Descriptors: (*Thrust, Optimization), (*Rockets, Thrust), Control, Drag, Functions, Sounding rockets, Fuels

The problem considered is that of finding the thrust program, or control, as a piecewise continuous function of time, so that, with a fixed fuel supply, the summit altitude of a rocket in vertical flight is maximized. Under the assumptions that an optimal control exists and that the upper bound of thrust is at a sufficiently high magnitude, it is proved that the optimal control contains at most three subarcs. The analysis extends the previous results of Miele, Leitmann, and others to a larger class of drag functions. One of the drag functions, belonging to the class considered in the present analysis, is shown to correspond to a drag coefficient witnessing a sharp increase in the neighborhood of the speed of sound. (Author)

Field 20-PHYSICS

20/1. ACOUSTICS

AD-628 936 Fld. 20/1, 20/4, 19/4
CFSTI Prices: HC $3.60 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD UNDERWATER EXPLOSIONS DIV
UNDERWATER SHOCK WAVE FREQUENCY SPECTRUM ANALYSIS. IV. FORTRAN IV PROGRAMS FOR THE IBM-7090 COMPUTER,
by Mary Alice Genau. 4 Feb 66, 38p. Rept. no. NOLTR-66-3,
Proj. NOL-785/ARPA
Unclassified report

Descriptors: (*Underwater explosions, Shock waves), (*Shock waves, Underwater explosions), (*Programming (Computers), Acoustics), Oceanology, Explosion effects, Data processing systems

Programs for the IBM-7090 computer are described; these produce plots of the amplitude and energy spectra of underwater explosion pressure pulses from digital tape input. The programs also compute the following pulse parameters: impulse, energy, maximum pressure, time duration, and energy in frequency bands of the entire pulse or any part of it. (Author)

AD-628 938 Fld. 20/1
CFSTI Prices: HC $1.00 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
MEASUREMENTS OF THE SPATIAL CORRELATION OF AMBIENT NOISE USING A DEEP-SUBMERGENCE VEHICLE (DIVING SAUCER SP-300).
Research rept.,
by Gerald L. Assard, and Beverly C. Hassell. 2 Feb 66, 25p. Rept. no. USL-714,
Proj. USL-1-405-00-00,
Unclassified report

Descriptors: (*Acoustics, Underwater sound), (*Underwater sound, measurement), Hydrophones, Deep submergence, Underwater equipment

During February and March 1965, experimental measurements were made of the spatial correlation of ambient noise in the horizontal and vertical planes at two different depths using Diving Saucer SP-300 as a measuring platform. A hydrophone array, which was designed to form a geometrically spaced line array that could be rotated to receive data in either plane, was attached to the SP-300. The hydrophone outputs were band-passed through 4001200 cps Butterworth filters and recorded on a sevenchannel, battery-operated tape recorder. The recorded data were played back through 400-600, 600-800, 800-1000, and 1000-1200 cps filters and selected pairs were crosscorrelated. Good agreement was found between the experimental values of spatial correlation and the theoretical values, except when measurements were hampered by shipping in the area and pitch and roll and rotation of the SP-300. (Author)

AD-628 942 Fld. 20/1, 4/1
CFSTI Prices: HC $3.60 MF $0.50
ANTENNA RESEARCH LAB THOMPSON RAMO WOOLDRIDGE INC COLUMBUS OHIO
A METHOD FOR THE COMPUTATION OF NORMAL MODE DISPERSION CURVES OF ATMOSPHERIC GRAVITY WAVES IN WINDY ATMOSPHERES,
by Allan D. Pierce. 4 Jan 66, 32p. Rept. no. Scientific-4,RAD-TR-66-8
Contract AF 19 (628)-3891, Proj. AF-7637, Task 763702,
AFCRL 66-44
Unclassified report

Descriptors: (*Acoustics, Atmosphere), (*Atmosphere, Acoustics), Gravity, Mechanical waves, Sound, Propagation, Wind

The multiplayer approximation previously used to study propagation in windfree atmospheres is extended to include winds. Two generalized acoustic potentials are defined. These are continuous even at horizontal discontinuities in wind velocity or sound speed, and the residual equations which

these quantities satisfy are derived. Two dispersion functions are defined. Their roots give the phase velocity magnitude and phase velocity direction for normal mode waves propagating with given frequency and given group velocity direction. The multilayer approximation is introduced for computing these dispersion functions by approximating continuously stratified atmospheres with models consisting of a finite number of layers, each with constant wind velocity and sound speed. Numerical methods for finding the roots of the dispersion function are discussed. The theory is then applied to an example of a multilayered atmosphere. (Author)

AD-629 175 Fld. 20/1, 20/2, 20/3
CALIFORNIA UNIV SAN DIEGO DEPT OF PHYSICS
ON THE DETECTION OF SECOND SOUND IN CRYSTALS BY LIGHT SCATTERING,
by A. Griffin. 18 Jun 65, 6p. Contract AF-AFOSR-610-64, Proj. AF-9761, Task 976101, AFOSR 66-0276
Unclassified report

Availability: Published in Physics Letters v17 n3 p208-10 15 Jul 1965. Copies to DDC users only.

Descriptors: (*Crystals, Thermal radiation), (*Helium, Thermal radiation), (*Thermal radiation, Superfluidity), Light, Thermal conductivity, Probes (Electromagnetic)

Since the experimental discovery of second sound in He II, it has been repeatedly suggested that a similar phenomenon should also occur in anharmonic crystals. However, it turns out that the minimum frequency for weakly damped temperature waves in solids is much larger than in He II, and thus their direct excitation by an oscillating heat source is more difficult. The major purpose of this letter is to suggest that Rayleigh scattering of light may hold great promise as a probe for collective temperature waves in pure anharmonic crystals, although it is useless in He II. A formal dispersion relation for second sound (in normal systems) involving a frequency dependent thermal conductivity coefficient is also reported. (Author)

AD-629 214 Fld. 20/1, 20/4
CFSTI Prices: HC $1.60 MF $0.50
MICHIGAN UNIV ANN ARBOR
ON THE DISPERSION OF SOUND IN HELIUM,
by C. S. Wang Chang. 1 May 48, 14p. Contract NOrd-7924,
Unclassified report

Prepared in Cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., Contract NOrd-7386, Rept. no. APL/JHU/CM-467.

Descriptors: (*Helium, Sound transmission), (*Sound, Scattering), Relaxation time, Mathematical analysis, Velocity

AD-629 276 Fld. 20/1
PACIFIC NAVAL LAB ESQUIMALT (BRITISH COLUMBIA)
TEMPERATURE-AND WIND-DEPENDENT AMBIENT NOISE UNDER MIDWINTER PACK ICE,
by J. H. Ganton, and A. R. Milne. 1965, 7p.
Rept. no. Reprint-65-8,
Unclassified report

Availability: Published in The Journal of the Acoustical Society of America v38 n3 p406-11 Sep 1965. Copies to DDC users only.

Descriptors: (*Acoustics, Underwater sound), (*Underwater sound, Ice islands), (*Ice islands, Underwater sound), Thermal stresses, Fracture (Mechanics), Noise

Measurements of ambient noise under shorefast pack ice during winter revealed two distinct noise-producing mechanisms. One mechanism was the production of tensile cracks at the surface of the sea ice by thermal stresses caused by decreasing air temperatures. The resulting ice-cracking sounds produced impulsive noise. The second mechanism was the interaction of the granular ice surface with the wind, which produced Gaussian noise. Separate pressure spectra are presented for underwater noise generated by each mechanism. The spectra and the statistical properties of the underwater noise appeared to be related to the local meteorology and the temperature changes within the ice cover. (Author)

AD-629 364 Fld. 20/1
DEFENCE RESEARCH BOARD OTTAWA (ONTARIO)
UNUSUAL AUDIBILITY OF THE SUFFIELD EXPLOSION IN CANADA, JULY 1964,
by George H. Gilbert. 1964, 7p.
Unclassified report

Availability: Published in Weatherwise v18 n4 p166-75 Aug 1965. Copies to DDC users only.

Descriptors: (*Sound transmission, Atmosphere), (*Atmosphere, Sound transmission), (*Acoustics, Atmosphere), Explosions, Auditory perception, Canada, Atmospheric refraction

AD-629 646 Fld. 20/1, 1/3
CFSTI Prices: HC $11.60 MF $0.75
ROCHESTER APPLIED SCIENCE ASSOCIATES INC N Y.
A THEORY FOR PREDICTING THE ROTATIONAL NOISE OF LIFTING ROTORS IN FORWARD FLIGHT, INCLUDING A COMPARISON WITH EXPERIMENT.
Technical rept.,
by Robert G. Loewy, and Lawrence R. Sutton. Jan 66, 113p. Rept. no. RASA-65-10, Contract DA-44-177-AMC-204 (T), Task 1P121401A14801, USAAVLABS TR-65-82
Unclassified report

Descriptors: (*Helicopters, Noise), (*Propeller noise, Mathematical prediction), Helicopter rotors, Flight testing, Rotation, Lift, Theory, Fourier analysis

A theory and resultant calculations are presented, predicting the noise generated by a lifting rotor in forward flight. With suitable adjustments in parameters, this theory reproduced (by numerical integration) the closed form results of Garrick and Watkins in their investigation of noise produced by a propeller. The theory presented here accounts for (1) asymmetry of inflow, lift, and drag; (2) nonlinear section characteristics, compressibility, and reverse flow; (3) first harmonic and steady rigid blade flapping and pitching; (4) rotor shaft tilt; and (5) chordwise distribution of lift and drag forces. Sound pressure levels were evaluated for up to 20 harmonics at a general field point translating with the rotor hub, for the H-34 and HU-1 helicopters. A comparison with experiment is also presented. (Author)

AD-628 939 **See Fld. 20/2**

AD-628 941 **See Fld. 20/5**

AD-628 965 **See Fld. 8/1**

AD-629 138 **See Fld. 7/4**

AD-629 295 **See Fld. 7/3**

AD-629 531 **See Fld. 7/4**

20/2. CRYSTALLOGRAPHY

AD-628 939 Fld. 20/2, 20/1, 11/6
CFSTI Prices: HC $1.25 MF $0.50
WATERVLIET ARSENAL N Y BENET LABS
THE RECOVERY OF THE ULTRASONIC ATTENUATION IN COPPER SINGLE CRYSTALS FOLLOWING SMALL PLASTIC DEFORMATION.
Technical rept.,
by Julius Frankel. Dec 65, 46p. Proj. DA-1-C-0-14501-B33A, WVT 6533
Unclassified report

Descriptors: (*Deformation, Crystal lattice defects), (*Single crystals, Copper), (*Ultrasonic radiation, Attenuation), Recovery, Defects (Materials)

Copper single crystals of 99.9% purity were deformed about .5% in tension at temperatures in the range 332.5 to 368K. The ultrasonic attenuation was measured continuously after deformation at a frequency of about 17Mc. During the measurement the specimen was in the load-off condition and at the deformation temperature. It is found by use of the Granato, Hikata and Lucke recovery theory, that the Cottrell-Bilby 't (2/3)' strain aging law is obeyed in the recovery of the ultrasonic attenuation. In most cases the use of an incubation time is required which differentiates between the time the deformation stopped and the time at which the t (2/3) law seems to take effect. The recovery parameters for the three low temperature runs plotted against 1/kT yield 1.0 plus or minus 0.2 ev as the activation energy for migration of the deformation-formed defect. The defect is therefore identified as the vacancy. It was possible to determine the approximate time after deformation stopped for which the pinning point density on the dislocations is a maximum. These times can be correlated with the times obtained by Birnbaum's low temperature strain-aging technique. (Author)

AD-628 985 Fld. 20/2, 11/6
CFSTI Prices: HC $1.00 MF $0.50
MANLABS INC CAMBRIDGE MASS
THE LATTICE STABILITY OF METALS V, VANADIUM, CHROMIUM, COBALT AND NICKEL.
Technical rept.,
by Larry Kaufman. Feb 66, 25p. Rept. no. TR-12,
Contract Nonr-2600 (00),
Unclassified report

Descriptors: (*Transition elements, Crystal lattices), (*Phase studies, Transition elements), Stability, Enthaly, Entropy, Crystal structure, Vanadium, Chromium, Cobalt, Nickel

The enthalpy and entropy differences between the b.c.c., h.c.p. and f.c.c. structures of the transition elements previously estimated for second and third row transition elements have been extended to vanadium chromium, cobalt and nickel by assuming that the stability parameters for these elements are equal to those estimated for their second and third row counterparts. The resulting free energy differences have been employed to compute eighteen binary phase diagrams between the V, Cr, Co and Ni group and other transition elements exhibiting different stable crystal structures. The computations, which are restricted to cases where miscibility gaps are absent, have been performed on the basis of ideal liquid, b.c.c., h.c.p. and f.c.c. phases in order to afford the clearest possible comparison with observed phase diagrams. (Author)

AD-629 154 Fld. 20/2, 20/5
CFSTI Prices: HC $3.60 MF $0.50
LEXINGTON LABS INC CAMBRIDGE MASS
VAPOR PHASE GROWTH OF RUBY MONOCRYSTALS.
Semiannual technical summary rept., 1 Jul 65-1 Jan 66,
by Philip S. Schaffer. Feb 66, 35p. Contract Nonr-4574 (00), ARPA Order-306
Unclassified report

Descriptors: (*Ruby, Single crystals), (*Crystal growth, Ruby), Vapors, Rods, Doping, Chromium compounds, Oxides

The vapor phase growth technique was further developed for the growth of large, high purity, low strain ruby monocrystals for laser applications. Constant growth temperature and reactant gas flow rate control units were incorporated into the crystal growth system. Other modifications were made in the growth system which permitted longer continuous runs than had been previously achieved. Ruby crystals were grown up to a weight of 96.3 grams in 58 hours. Some of the variables affecting the formation rate of chromium chloride were investigated. Some causes of gas inclusion-type defects were isolated and crystals were grown defect-free. Vapor-grown substrates were prepared from large crystals. A cylindrical ruby rod was fabricated without annealing from the 96.3-gram crystal. A threshold energy of 24.9 joules input was measured. Twyman-Green interferometry showed one fringe in the vapor-grown rod. Electronbeam microprobe analysis over the cross-section of the 96.3 gram crystal showed a chromium concentration deviation of plus or minus 8.77% or plus or minus 5 ppm. (Author)

AD-629 481 Fld. 20/2, 11/2, 7/4
CFSTI Prices: HC $5.00 MF $1.00
CORNELL UNIV ITHACA N Y DEPT OF ENGINEERING PHYSICS
DIFFUSION OF OXYGEN IN MAGNESIUM OXIDE.
Technical rept.,
by L. H. Rovner. 1 Mar 66, 159p. Rept. no. TR-10,
Contract Nonr-401 (31) Proj. NR-036-035,
Unclassified report

Descriptors: (*Oxygen, Diffusion), (*Diffusion, Ceramic materials), (*Magnesium compounds, Oxides), Crystal lattice defects, Transport properties, Pressure, Heat of activation

Diffusion of oxygen in magnesium oxide is measured in the temperature range 750-1150C at 1 torr oxygen pressure. The measurements utilized an oxygen-18 isotopic exchange technique to measure diffusion coefficients as small as 10 to the minus 20th power sq cm/sec. Interference from diffusion down enhanced diffusivity channels is observed. Both intrinsic and extrinsic lattice diffusion is observed. In the intrinsic region the activation energy, Q, is 82.1 plus or minus 3 kcal/mole and D varies as P (02) to the 0.22 plus or minus 0.1 power sq cm/sec. For extrinsic diffusion Q = 30. 2 plus or minus 3 kcal/mole. This same activation energy is found in a crystal doped with chromium: Q = 34.0 plus or minus 4 kcal/mole. Also, D varies as P (02) to the 0.48 plus or minus 0.05 power. These data are compatible with an interstitial oxygen mechanism for both crystals. In a lithium-doped crystal, Q = 42.6 plus or minus 4 kcal/mole and D varies as P (02) to the minus 0.7 plus or minus 0.25 power sq cm/sec. This is consistent with an oxygen vacancy mechanism. Under conditions appropriate for intrinsic diffusion, magnesium oxide is shown to be an oxygen excess structure. Charge compensation is by formation of trapped-hole defects. In lithium-doped material, trapped-electron defects are present. These defect species are important to the electrical conductivity properties of magnesium oxide. (Author)

AD-629 482 Fld. 20/2, 11/2
CFSTI Prices: HC $3.00 MF $0.50
CORNELL UNIV ITHACA N Y DEPT OF ENGINEERING PHYSICS
DISLOCATION STRUCTURES IN CLEAVED MAGNESIUM OXIDE.
Technical rept.,
by J. L. Robins, R. L. Gerlach, and T. N. Rhodin. 1 Mar 66, 57p. Rept. no. TR-11,
Contract Nonr-401 (31), Proj. NR-036-035,
Unclassified report

Descriptors: (*Crystal lattice defects, Ceramic materials), (*Deformation, Crystal lattice defects), (*Magnesium compounds, Oxides), Crystal structure, Surface properties, Crystallography, Cutting

Surface structures produced during cleavage of magnesium oxide are described and interpreted in terms of the production and motion of dislocations. The usefulness and applicability of the nucleation decoration technique to obtain high resolution micrographs of surface structures is presented. The observed surface structures are described in terms of production and termination of line pairs associated with the cutting of screw components, the interaction of dislocation half-loops with the surface and the occurrence of cross-glide and of dislocation multiplication. (Author)

AD-629 557 Fld. 20/2
CFSTI Prices: HC $2.60 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
A TEST OF VISCOUS DISLOCATION DAMPING THEORY,
by Nicholas F. Flore. Oct 65, 26p. Rept. no. BRL-1298,
Proj. 1P014501A33E,
Unclassified report

Descriptors: (*Crystal lattice defects, Damping), (*Single crystals, Crystal lattice defects), Copper, Germanium, Internal friction, Radiation damage, Viscosity

The amplitude-independent dislocation damping of a series of dilute copper-germanium single crystals has been studied as a function of composition and frequency. The measurements have been performed at room temperature on annealed and gamma-irradiated single crystals driven in longitudinal resonance at 80 and 240 kilocycles per second by means of the Marx piezoelectric oscillator. The results indicate that the Granato-Lucke viscous damping analysis cannot account for the observed magnitude and composition dependence of the damping, although the damping is proportional to frequency in agreement with the theory. They further show that a gamma-ray dose of 2 x 10 to the 8th rads is sufficient to suppress the damping to a composition-independent value of 1 x 10 to the minus 4 which does not decrease with further irradiation. There is evidence that the total damping consists of a composition-dependent edge dislocation loss superposed on a composition-independent screw dislocation loss. (Author)

AD-629 565 Fld. 20/2, 20/12
CFSTI Prices: HC $2.00 MF $0.50
QUEENS LAB INC EDISON N J
RESEARCH ON LOW FREQUENCY MEASUREMENTS.
Final rept. 1 May 61-30 Oct 65,
by Harold T. Smith, William H. Bauer, M. B. Smyth, and J. F. Mooney. Nov 65, 36p. Contract AF 33 (616)-8279, Proj. 7021, ARL 65-235
Unclassified report

Descriptors: (*Single crystals, Aluminum compounds), (*Crystallography, Aluminum compounds), Oxides, Low frequency, Electrical properties, Mechanical properties, Test equipment, Solid state physics

The results of studies of the very low frequency mechanical and electrical properties of single crystals are reported. The construction and calibration of the equipment used for maximum precision and reproducibility of results are described. (Author)

AD-629 668 Fld. 20/2, 20/12
COLUMBIA UNIV NEW YORK DEPT OF MECHANICAL ENGINEERING
THERMAL EFFECTS ON DISLOCATION VELOCITIES IN A LINEAR CHAIN,
by J. H. Weiner. 25 Feb 65, 10p. Contract AF-AFOSR-228-63, Proj. AF-9761, Task 976101, AFOSR 65-2576
Unclassified report

See also AD-616 215.

Availability: Published in The Physical Review v139 n2A pA442-9 Jul 19 1965. Copies to DDC users only.

Descriptors: (*Crystal lattice defects, Stresses), Shear stresses, Thermal stresses, Velocity, Deformation, Loading (Mechanics), Computers, Simulation, Temperature

The effects of the thermal motion of atoms upon a dislocation in steady motion in a modified Frenkel -Kontorowa model are examined. The energy associated with the localized mode due to the dislocation and the energy associated with the nonlocalized modes are considered separately and referred to as the energy of the dislocation system and of the surrounding heat bath, respectively. Several distinct components of the net energy exchange between dislocation system and heat bath are isolated. In particular, one component is found which may be described as a coordinating effect between the thermal motion of the atoms and the dislocation motion, which results in a transfer of energy from the heat bath to the moving dislocation. When model parameter values are chosen so that this component of energy transfer is dominant, the drag on a moving dislocation in the model studied decreases with increase in temperature. Computer simulation of the model lends support to the principal features of the theory. (Author)

AD-629 698 Fld. 20/2, 7/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
THE CRYSTAL AND MOLECULAR STRUCTURE OF 7,7,8,8-TETRACYANOQUINODIMETHANE
by Robert E. Long, Robert A. Sparks, and Kenneth N. Trueblood. 24 Jul 64, 10p. Contract AF-AFOSR-240-63, AFOSR 65-2361
Unclassified report

Availability: Published in Acta Crystallographica v18 pt5 p932-9 May 65. Copies to DDC users only.

Descriptors: (*Nitriles, Crystal structure), (*Crystal structure, Nitriles), (*Molecular structure, Nitriles), Crystal lattices, Least squares method, Chemical bonds, Molecular properties

TCNQ forms orange-red monoclinic crystals belonging to space group C2/c, with a0 = 8.906, b0 = 7.060, c0 = 16.395 A, beta = 98.54 degrees, and four centrosymmetric molecules in the unit cell. The structure was solved by conventional Patterson methods and independently by a computer search of possible structures consistent with reasonable molecular packing. It was refined by full-matrix least-squares methods. The molecule, which has essentially mmm symmetry, librates through a r.m.s. amplitude of about 5.5 about its long axis. The bond distances are in good accord with the predictions of simple molecular orbital theory. (Author)

AD-629 701 Fld. 20/2, 11/6
CLEMSON UNIV S C
SIZE EFFECTS IN RESIDUAL RESISTANCE RATIOS FOR ZINC 'WHISKERS',
by M. J. Skove, and E. P. Stillwell. 9 Sep 65, 4p. Contract AF-AFOSR-180-63, AFOSR 66-0222
Unclassified report

Availability: Published in Applied Physics Letters, v7 n9 p241-2 Nov 1 1965. Copies to DDC users only.

Descriptors: (*Whiskers (Crystals), Zinc), (*Zinc, Resistance (Electrical)), Single crystals, Particle size

AD-629 713 Fld. 20/2, 20/12
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
OXYGEN COORDINATES OF COMPOUNDS WITH GARNET STRUCTURE.
Physical sciences research papers, revised ed., by Ferdinand Euler, and Jan A. Bruce. 19 Apr 65, 12p. Rept. no. AFCRL-PSRP-189,AFCRL-66-59
Proj. AF-5621, Task 562104,
Unclassified report

Revision of manuscript submitted 23 May 63.

Availability: Published in Acta Crystallographica v19 pt6 p971-8 Dec 1965. Copies to DDC users only.

Descriptors: (*Garnets, Crystal structure), Matrix algebra, Least squares method, Oxygen, Oxides, Aluminum compounds, Gallium compounds, Iron compounds, Lutetium compounds, Ytterbium compounds, Yttrium compounds, Gadolinium compounds, Dysprosium compounds, Samarium compounds

By full-matrix least squares refinement, the O parameters of one natural and twelve synthetic garnets M5R3O12 were determined, with M:Al, Ga, or Fe and R:Lu, Yb, Y, Gd, Dy or Sm. The refinement was based on those Bragg reflections to which only the oxygen ions contribute. The integrated X-ray intensities were counted after elimination of Renninger effects. The resulting O parameters are interpreted by polar coordinates which indicate size, shape and orientation of the oxygen octahedra and are closely associated with the effects of shortened shared edges on the shape of the other polyhedra. The cell edges alpha are studied as functions of the rare-earth atomic numbers. The crystal field effects on alpha, shown by Espinosa on iron garnets with non-spherical ions R, appear also in the other two series. For spherical R, the increments delta a associated with changes in M and R are independent of each other. Such additivity of alpha is destroyed in Al5Gd3O12 by the resistance of the large rare-earth ions to the small lattice. These effects are demonstrated also on selected interionic distances and angles. (Author)

AD-629 734 Fld. 20/2, 20/12
CFSTI Prices: HC $1.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF MECHANICS
TWIST MODULUS FOR A 6-CONSTANT CENTRO-SYMMETRIC CUBIC CRYSTAL,
by W. H. Hoppmann II, and V. X. Kunukkasseril. Feb 66, 25p. Contract DA-30-069-AMC-589 (R)
Unclassified report

See also AD-619 914.

Descriptors: (*Crystals, Elasticity), Models (Simulations), Symmetry (Crystallography), Deformation, Shear stresses, Isotropism

A study is presented of the statical deformation of a mechanical model of a supposed 6-constant centro-symmetric cubic crystal which exhibits the phenomenon of couple stresses. A description of the design and construction of the model and the loading apparatus is given. The related theory of deformation of such a crystal is summarized and used in order to determine the elastic constants. The specific constitutive equations are shown. Experimental results are given for the model loaded on its boundary in a simple manner. The solutions of the equations of equilibrium satisfying the given boundary conditions are obtained and used for the determination of the constants. The complete set of numerical values of the constants are tabulated and discussed. One of the principal aims of the research was the determination of the twist modulus. (Author)

AD-629 745 Fld. 20/2, 20/13
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF PURE CHEMISTRY
TEMPERATURE FACTORS AND THERMODYNAMIC PROPERTIES OF CRYSTALS,
by T. H. K. Barron, A. J. Leadbetter, J. A. Morrison, and L. S. Salter. 26 Apr 65, 7p.
NRC 8809
Unclassified report

Availability: Published in Acta Crystallographica, v20 pt1 p125-31 Jan 1966. Copies to DDC users only.

Descriptors: (*Crystals, Thermal properties), (*Thermodynamics, Crystals), Temperature, Thermal expansion, Crystal lattices, Vibration, Mathematical analysis, Statistical functions

Temperature factors and thermodynamic properties of crystals can be related easily and practically by use of the quasi-harmonic description of lattice vibrations. The explicit introduction of particular forms of frequency distributions or force-constant models is not required. For cubic crystals containing one type of atom, temperature factors can usually be obtained more accurately from thermodynamic data than from scattering measurements. For more complicated structures containing different kinds of atoms, the thermodynamic data are related to a linear combination of temperature factors. (Author)

AD-629 749 Fld. 20/2
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF PURE PHYSICS
STRESSES ON SECONDARY SYSTEMS DUE TO PILED -UP GROUPS OF DISLOCATIONS OF ARBITARY ORIENTATION.
Revised ed.,
by Z. S. Basinski, and T. E. Mitchell. 6 Jul 65, 12p.
NRC 8780
Unclassified report

Prepared in cooperation with Case Inst. of Tech., Cleveland, Ohio. Revision of manuscript submitted 15 Apr 65.

Availability: Published in Philosophical Magazine, v13 n121 p103-14 Jan 1966. Copies to DDC users only.

Descriptors: (*Crystal lattice defects, Internal friction), (*Internal friction, Crystal lattice defects), Stresses

Stress-fields around piled-up groups of dislocations of arbitrary orientation have been calculated by replacing the discrete dislocations by a continuous distribution of infinitesimal dislocations. Previous calculations by Mitchell have been performed on edge and screw dislocation pile-ups. In the present paper the case of 60 degree dislocations has been considered in particular, since in face-centred cubic crystals the dislocations will lie parallel to the intersection of the primary and conjugate or critical slip planes. It is shown that the stress-fields on many secondary slip systems are large and are capable of producing secondary slip over distances of the order of the pile-up length. Considerable reduction of long-range stresses is possible by the formation of tangles of primary and secondary dislocations whose Burgers vectors add up to zero and by the formation of small angle tilt boundaries. It is necessary that the primary and secondary dislocation densities should be of the same order, as is observed experimentally. The amount of secondary strain necessary for such high dislocation densities is small and is compatible with experimental observations. (Author)

AD-628 946 See Fld. 5/1

AD-628 957 See Fld. 11/6

AD-629 058 See Fld. 20/12

AD-629 061 See Fld. 7/4

AD-629 069 See Fld. 20/12

AD-629 170 See Fld. 20/5

AD-629 175 See Fld. 20/1

AD-629 188 See Fld. 20/12

AD-629 200 See Fld. 20/12

AD-629 232 See Fld. 7/4

AD-629 251 See Fld. 7/4

AD-629 292 See Fld. 20/12

AD-629 293 See Fld. 20/12

AD-629 298 See Fld. 20/12

AD-629 429 See Fld. 20/12

AD-629 438 See Fld. 8/7

AD-629 490 See Fld. 11/2

AD-629 550 See Fld. 17/2

AD-629 658 See Fld. 20/12

AD-629 659 See Fld. 20/12

AD-629 660 See Fld. 20/12

AD-629 661 See Fld. 20/12

AD-629 688 See Fld. 20/12

AD-629 699 See Fld. 11/2

AD-629 716 See Fld. 20/12

20/3. ELECTRICITY AND MAGNETISM

AD-629 018 Fld. 20/3, 20/12
CFSTI Prices: HC $1.00 MF $0.50
NORTHEASTERN UNIV BOSTON MASS
A STUDY OF THE EFFECTS OF CRYSTALLINE ELECTRIC FIELDS ON FERROMAGNETS.
Final rept., Oct 63-Oct 65,
by Walter Hauser. Dec 65, 17p. Contract AF 19(628)-3811, Proj. AF-5621, Task 562104, AFCRL 66-56
Unclassified report

Descriptors: (*Ferromagnetic materials, Electric fields), (*Atomic energy levels, Ferromagnetic materials), Nuclear spins, Hamiltonian, Anisotropy, Theory, Iron, Ions, Crystal lattices, Symmetry (Crystallography), Wave functions

The one-ion theory of anisotropy is examined on the basis of symmetry. The most general spin-hamiltonian for the energy levels of a magnetic ion in a cubic crystalline environment is constructed and the origin of the new terms which appear investigated. The contribution of the new terms to the anisotropy constant k-1 (T) is derived. (Author)

AD-629 062 Fld. 20/3, 20/12
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
DOUBLE EXCHANGE FOR POLARONS,
by J. Smit. 1965, 4p. Contract AF-AFOSR-496-64, Proj. AF-4751,
AFOSR 65-2117
Unclassified report

Availability: Published in Journal of Applied Physics, v36 n3 (pt2) p1143-4 Mar 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetic materials, Electrical conductance), (*Electrical conductance, Quantum mechanics), (*Semiconductors, Fer-

romagnetic materials), (*Carriers (Semiconductors), Ferromagnetic materials), Metals, Transformations, Ions, Band theory of solids, Polarization

The transition of a metallic type of electronic conductivity to a semi-conducting one, observed at the Curie point in several ferromagnetic compounds with mixed valency, is explained in the limit of heavy ions. It is shown that above the Curie point the susceptibility should obey the Curie-Weiss law. (Author)

AD-629 080 Fld. 20/3
CATHOLIC UNIV OF AMERICA WASHINGTON D C
EFFECT OF N-SPIN-WAVE INTERACTION ON THE LOW-TEMPERATURE SPONTANEOUS MAGNETIZATION,
by Tohru Morita, and Tomoyasu Tanaka. 11 Aug 64, 6p. Contract AF-AFOSR-445-63, AFOSR 65-2866

Unclassified report

Prepared in cooperation with Naval Ordnance Lab., White Oak, Md.

Availability: Published in Journal of Mathematical Physics v6 n7 p1152-4 Jul 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetic materials, Spin), Field theory, Hamiltonian, Quantum mechanics, Low temperature research

The low-temperature behavior of a Heisenberg ferromagnet is described well by the theory of spin waves introduced by Bloch. The leading correction to the ideal spin-wave approximation was first evaluated by Dyson. Dyson solved the two-spin-wave problem and calculated the leading correction of order T4 for the spontaneous magnetization. He discusses the correction due to the three-spin-wave problem and showed that it is of order T13/2; though he was not certain about O (T (6)). The purpose of this paper is to give a general discussion of the order of magnitude of the corrections due to two-, three-, ..., n-spin wave problems. This discussion is based on a simple conjecture on the low-lying energy levels of two-, three-, ..., n-spin-wave problems and a compact virial-expansion formula for an assembly of quasiparticles, obtained quite recently by the present authors.

AD-629 162 Fld. 20/3
CFSTI Prices: HC $4.00 MF $0.75
RADIO CORP OF AMERICA LANCASTER PA ELECTRONIC COMPONENTS AND DEVICES
IMPROVED PULSED PHOSPHORS.
Final rept. Oct 64-Oct 65,
by S. A. Harper. Jan 66, 111p. Contract AF 30 (602)-3557, Proj. AF-5597, Task 559703, RADC TR-65-478

Unclassified report

Descriptors: (*Display systems, Phosphorescent materials), (*Phosphorescent materials, Electroluminescence), (*Electroluminescence, Phosphorescent materials), Electric currents, Excitation, Alternating current, Direct current, Electromagnetic pulses, Zinc compounds, Sulfides, Selenides, Dielectrics, Brightness, Life expectancy, Performance (Engineering)

Astudy was made of electroluminescent (EL) materials and procedures for the purpose of evaluating and improving their performance under pulsed excitation conditions. Zinc sulfide and zinc sulfoselenide powder phosphors in plastic dielectric mediums were studied under pulsed excitations in the form of sinusoidal ac bursts, rectangular dc pulses and dc bursts (groups of high frequency dc pulses). Optimum values of the integrated light output while maintaining adequate arcing strengths of the EL layers are given below for a duty cycle of 0.1%. The repetition rate was constant at 30 pulses or bursts per second. Excitation with 150 kc bursts yielded integrated light outputs of about 10 ft .L. while the maintenance (hours to one-half of initial brightness) was 1300 and 3500 hours for two different phosphors. About 5 ft.L. of integrated brightness was obtained from dc pulsed excitation and maintenance values of several thousands of hours. Measurements with dc bursts indicated 7 to 8 ft.L. as the optimum values of the output with this method of excitation. (Author)

AD-629 182 Fld. 20/3, 20/10
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
BLOCH ELECTRONS IN EXTERNAL ELECTRIC AND MAGNETIC FIELDS,
by H. C. Praddaude. 23 Jun 65, 7p. Contract AF 49 (638)-1468, AFOSR 66-0083

Unclassified report

Availability: Published in The Physical Review v140 n4A pA1292-6 15 Nov 1965. Copies to DDC users only.

Descriptors: (*Electrons, Dynamics), (*Magnetic fields, Electrons), (*Electric fields, Electrons), Quantum mechanics, Partial differential equations, Hamiltonian

The Schrodinger equation for a Bloch electron in external electric and magnetic fields is rewritten with the help of redundant variables, the wave function being obtained when a limiting process is carried out. The connection with the standard effective-mass approximation is discussed, and an application to the case of crossed electric and magnetic fields is carried out for the simple case of two parabolic bands in order to examine the singularity 1/2m* (E/B) squared that appears in the energy in the effective-mass approximation when B-0+. Below a certain value of E/B the character of the solution is concluded to change and the effective-mass formula is then not applicable. (Author)

AD-629 185 Fld. 20/3, 20/12, 11/6
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
EFFECTS OF HIGH MAGNETIC FIELDS ON THE ULTRASONIC VELOCITY AND ATTENUATION IN NB-25% ZR,
by Y. Shapira, and L. J. Neuringer. 4 Oct 65, 4p. Contract AF 49 (638)-1468, AFOSR 66-0228

Unclassified report

Availability: Published in Physical Review Letters v15 n18 p724-7 Nov 1, 1965. Copies to DDC users only.

Descriptors: (*Ultrasonic radiation, Niobium alloys), (*Niobium alloys, Zirconium alloys), Propagation, Magnetic fields, Superconductivity, Ultrasonic properties, Velocity, Attenuation, Supre conductors

The report contains the observation of changes in the velocity and attenuation of ultrasonic waves propagating in the superconducting and normal states of Nb-25% Zr, caused by the presence of a high dc magnetic field.

AD-629 190 Fld. 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
THE MINIMUM PROPAGATING CURRENT OF A COMPOSITE SUPERCONDUCTOR,
by J. E. C. Williams. 1 Sep 65, 4p. Contract AF 49 (638)-1468, AFOSR 66-0227

Unclassified report

Availability: Published in Physics Letters, v19 n2 p96-7 Oct 1 1965. Copies to DDC users only.

Descriptors: (*Superconductors, Thermal stability), Electric currents, Propagation, Electrical properties, Mathematical analysis, Composite materials

Recently Stekly (Avco-Everett Report 210, March 1965) has shown that it is possible to stabilize an inherently unstable superconductor at its short sample current by shunting it with sufficient normal material. Stable operation can also be achieved, however, at currents below the short sample value with less normal material. It is the purpose of this letter to show that this leads to an increased overall current density in some instances which should be considered in coil design.

AD-629 191 Fld. 20/3, 20/8
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
MOSSBAUER TECHNIQUES USING HIGH-FIELD WATER-COOLED SOLENOIDS,
by Norman A. Blum. 1965, 18p.
AFOSR 66-0268

Unclassified report

Availability: Published in Mossbauer Effect Methodology v1, 1965. Copies to DDC users only.

Descriptors: (*Mossbauer effect, Solenoids), (*Solenoids, Mossbauer effect), Liquid cooled, Electromagnets, Superconductivity

AD-629 194 Fld. 20/3
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
TEMPERATURE-OSCILLATION METHOD FOR OBSERVING DE-HAAS-VAN ALPHEN OSCILLATIONS AND OTHER MAGNETIC PHENOMENA,
by R. R. Oder, and E. Maxwell. 8 Sep 65, 4p. Contract AF 49 (638)-1468, AFOSR 66-0236

Unclassified report

Availability: Published in Physics Letters v19 n2 p108-9 Oct 1 1965. Copies to DDC users only.

Descriptors: (*Oscillation, Magnetic properties), (*Magnetic properties, Metals), Magnetic moments, Temperature, Measurement, Magnetism

The method consists of oscillating the temperature and measuring the resultant oscillation in the magnetic moment.

AD-629 240 Fld. 20/3
BRUSSELS UNIV (BELGIUM)
REMARK ON THE HYDROXYL ION SYSTEM IN ALKALI HALIDES,
by Robert Brout. 17 Nov 64, 3p. Contract AF-EOAR-51-63, AFOSR 65-2820

Unclassified report

Availability: Published in Physical Review Letters, v14 n6 p175-6 Feb 8 1965. Copies to DDC users only.

Descriptors: (*Hydroxides, Dielectric properties), Ions, Alkali metal compounds, Halides, Antiferromagnetism, Statistical analysis, Belgium

The dielectric constant of the hydroxyl ion is interpreted in terms of a random antiferroelectric array.

AD-629 320 Fld. 20/3, 20/14
VICTORIA UNIV (BRITISH COLUMBIA)
A MULTILAYER CONDUCTING EARTH IN THE FIELD OF PLANE WAVES,
by H. W. Dosso. 14 Jul 65, 10p.

Unclassified report

Availability: Published in Canadian Journal of Physics v44 p81-9 1966. Copies to DDC users only.

Descriptors: (*Conductivity, Theory), (*Electrical conductance, Geophysics), (*Electro-

magnetic waves, Electrical conductance), Magnetic fields, Electric fields, Mathematical analysis, Earth, Canada

Each of several thick layers is divided into a sufficient number of sublayers, with changing conductivity, to represent to a good approximation of continuous change in conductivity. Expressions for the amplitudes and phases of the electric- and magnetic-field components are obtained and evaluated for several different conductivity distributions. The conductivities and frequencies considered are of interest in geophysics. The results obtained indicate that the amplitudes and phases of the varying electromagnetic-field components are affected strongly by the inhomogeneity of the conducting medium. (Author)

AD-629 458 Fld. 20/3
ROCHESTER UNIV N Y
ANOMALOUS BEHAVIOR OF SUPERCONDUCTING MICROGEOMETRIES IN THE PRESENCE OF HIGH CURRENT DENSITIES,
by R. P. Groff, J. M. Mochel, and R. D. Parks.
6 Aug 65, 3p. Contract DA-ARO (D)-31-124-G489,
AROD 4374:6

Unclassified report

Availability: Published in Physical Review Letters v15 n12 p517-9 Sep 10 1965. Copies to DDC users only.

Descriptors: (*Superconductors, Electromagnetic properties), Geometric forms, Voltage, Magnetic fields, Hysteresis, Electric currents

AD-629 460 Fld. 20/3
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
DYNAMIC VORTEX EFFECTS IN THIN SUPERCONDUCTORS,
by J. M. Mochel, and R. D. Parks. 1964, 4p.
Contract DA-ARO (D)-31-124-G489,
AROD 4374:2

Unclassified report

Availability: Published in Low Temperature Physics -LT9 (Part A) p571-4 1965. Copies to DDC users only.

Descriptors: (*Superconductors, Magnetic fields), (*Magnetic fields, Superconductors), (*Films, Superconductors), Magnus force, Vortices, Electromagnetism, Microstructure, Magnetostriction

The electrical behavior of thin film constrictions of 1-5 micron in a perpendicular magnetic field is presented.

AD-629 463 Fld. 20/3
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
QUANTIZED VORTICES IN SUPERCONDUCTORS,
by R. D. Parks. 1965, 12p. Contract DA-ARO (D)-31-124-G489,
AROD 4374:3

Unclassified report

Availability: Published in Low Temperature Physics-LT9 (Part A) p34-45 1965. Copies to DDC users only.

Descriptors: (*Superconductors, Magnetic fields), (*Magnetic fields, Superconductors), Magnetostriction, Vortices, Magnus force, Electromagnetism, Microstructure

AD-629 714 Fld. 20/3, 20/12
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PHONON GENERATION BY MAGNETIC FILMS.
Physical sciences research papers,
by Marden H. Seavey Jr.. 4 Aug 65, 17p. Rept. no. afcrl-PSRP-183,AFCRL-66-4
Proj. AF-4600, Task 460003,

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n10 p1387-99 Oct 1965. Copies to DDC users only.

Descriptors: (*Phonons, Magnetic materials), (*Magnetic materials, Films), Nuclear magnetic resonance, Polarization, Transducers, Magnetic resonance, Sound, Magnetic fields, Metal films

The generation of microwave acoustic waves by the resonance modes in a magnetic film is discussed. A phonon power expression shows that space variations in the magnetoelastic constant, as well as in the microwave magnetization, provide sources for the phonon generation. The phonon power expression is applied to the cases of ferromagnetic resonance (FMR) and spin-wave resonance (SWR). The observed polarizations of the acoustic waves as a function of magnetization angle check with the theory in the FMR case. Qualitative agreement with theory also appears likely in the case of the phonon generation on certain SWR peaks. Uncertainties concerning the actual precessional mode in the film, however, contribute in making a quantitative comparison of experiment and theory rather difficult. It is shown that transducer frequency-response measurements offer promise of shedding light on the nature of the precessional modes. The assumed precessional mode and the phonon generation from this mode are described for the case of a microwave interaction with a strip-domain structure in a magnetic film. The strip-domain resonance (SDR) generates longitudinal acoustic waves and occurs at very low dc magnetic field values. By utilizing SDR and the dielectric cavity technique, efficient means for generating coherent acoustic power in the upper microwave-frequency region may be obtained. (Author)

AD-628 941 **See Fld. 20/5**

AD-629 059 **See Fld. 18/4**

AD-629 104 **See Fld. 17/6**

AD-629 141 **See Fld. 20/10**

AD-629 175 **See Fld. 20/1**

AD-629 189 **See Fld. 9/1**

AD-629 195 **See Fld. 20/12**

AD-629 504 **See Fld. 7/4**

AD-629 508 **See Fld. 20/12**

AD-629 654 **See Fld. 20/12**

20/4. FLUID MECHANICS

AD-629 011 Fld. 20/4
ILLINOIS UNIV URBANA DEPT OF MECHANICAL ENGINEERING
COMPRESSIBLE NON-ISOENERGETIC TWO-DIMENSIONAL TURBULENT (PR SUB T = 1) JET MIXING AT CONSTANT PRESSURE. AUXILIARY INTEGRALS, HEAT TRANSFER AND FRICTION COEFFICIENTS FOR FULLY DEVELOPED MIXING PROFILES.
Technical note, (2nd Ed),
by H. H. Korst, and W. L. Chow. Aug 63, 80p.
Rept. no. ME-TN-392-4,
Contract AF 18 (600)-392,

Unclassified report

Availability: Available from University of Illinois, $10.50.

Descriptors: (*Jet mixing flow, Mathematical analysis), Turbulence, Compressible flow, Two-dimensional flow, Heat transfer, Friction, Functions, Integrals, Graphics

Definitions and graphical presentation of auxiliary functions, calculated on a high speed digital computer (ILLIAC), pertaining to the two-dimensional nonisoenergetic turbulent jet mixing problem. Theoretical friction coefficients and Stanton Numbers for such mixing regions are given. The results facilitate especially the treatment of jet-slipstream interaction (base pressure and base temperature problem). (Author)

AD-629 044 Fld. 20/4
CFSTI Prices: HC $1.00 MF $0.50
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
VISCOUS HYPERSONIC FLOW WITH PARABOLIC AXIALLY SYMMETRIC SHOCK.
Research translation,
by V. S. Nikolaev. Dec 65, 15p. Rept. no. G-T-R-65-10,
Contract AF 19 (628)-5034,
TT 66-60685

Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Mekhanika i Mashinostroenie, n6 p48-52 1964.

Descriptors: (*Shock waves, Hypersonic flow), (*Hypersonic flow, Shock waves), Bodies of revolution, Boundary layer, Entropy, Axially symmetric flow, Blunt bodies, Turbulence, Mathematical analysis, USSR

The inverse problem of determining the flow field for parabolic axially symmetric shock with regard to interaction of the boundary layer with non-viscous flow is considered. For description of non-viscous flow, the theory of small displacements is used. On the basis of an analysis of the order of the quantities, the question is considered of the joining of the parameters of the boundary layer with the parameters of non-viscous flow. A statement of the problem is given permitting the consideration both of the interaction connected with the displacing influence of the boundary layer, and vortical interaction. Results are cited of numerical calculations of the flow fields between the solids and the shock wave. (Author)

AD-629 094 Fld. 20/4
CFSTI Prices: HC $6.60 MF $0.75
NEW YORK UNIV N Y
LAMINAR, TRANSITIONAL AND TURBULENT FLOW WITH ADVERSE PRESSURE GRADIENT ON A CONE-FLARE AT MACH 10.
Scientific interim rept.,
by Victor Zakkay, Alan Bos, and Paul Jensen, Jr.,
Dec 65, 70p. Rept. no. NYU-AA-65-6,
Contract AF 33 (615)-2215, Proj. AF-7064,
ARL 65-253

Unclassified report

Descriptors: (*Conical bodies, Hypersonic flow), (*Boundary layer, Flow separation), Pressure, Heat transfer, Nose cones, Laminar flow, Angle of attack, Turbulence, Blunt bodies

An experimental investigation of the boundary layer on a cone-flare body at Mach 10 is presented. Measurements of pressure, heat transfer and boundary layer thickness are made in regions of zero and adverse pressure gradient. Several noses are fitted to the cone to produce blunted cone-flares, which are used to study separation. The experimental results are compared to some recent analytical investigations. The results showed a small amount of blunting can lower the Reynolds number sufficiently to produce separation. The experiment results also showed that a small amount of crossflow (produced by placing the model at small angles of attack) was capable of eliminating separation.

AD-629 152 Fld. 20/4, 12/1
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y

STRUCTURE OF THE BOLTZMANN COLLISION OPERATOR,
by Leib Finkelstein. 9 Oct 64, 6p. Contract AF-AFOSR-62-266,
AFOSR 65-2335

Unclassified report

Availability: Published in The Physics of Fluids v8 n3 p431-6 Mar 1965. Copies to DDC users only.

Descriptors: (*Operators (Mathematics), Approximation (Mathematics)), (*Molecular beams, Potential theory), Energy, Momentum, Transport properties, Statistical mechanics

The full Boltzmann collision operator with an infinite collision cross section is investigated. It is shown that in the general case the operator is bilinear. The linearized collision operator is further explored and a new expression for the kernel in the form of a divergence is obtained. An approximation to the linearized operator is indicated, which may prove of value in numerical calculations. (Author)

AD-629 192 Fld. 20/4
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
SUPERFLUID FLOW IN A VENTURI TUBE,
by R. Meservey. 10 Mar 65, 6p. Contract AF 49 (638)-1468,
AFOSR 65-2575

Unclassified report

Availability: Published in The Physics of Fluids v8 n7 p1209-12 Jul 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Venturi tubes), Fluid flow, Acceleration, Rotation, Friction, Helium, Liquefied gases, Superconductors

It is shown from Bernouilli's equation that a Venturi tube or Pitot tube as ordinarily used will have practically no level difference with irrotational fluids. A quantitative solution is given in the case of a Venturi tube of various dimensions. The observed level difference with water follows simply from the rotational acceleration term of the Navier-Stokes equation. This result for irrotational fluids is discussed with respect to experiments using liquid helium and superconductors. (Author)

AD-629 212 Fld. 20/4
CFSTI Prices: HC $2.60 MF $0.50
POLITECNICO DI TORINO (ITALY) ISTITUTO DI MECCANICA APPLICATA
THEORETICAL INVESTIGATIONS ON THE BOUNDARY LAYER WITH PRESSURE GRADIENT.
Technical note (Scientific rept.),
by Ennio Mattioli. Aug 65, 24p. Rept. no. TN-32,Scientific-8
Contract AF-EOAR-98-63,
AFOSR 65-2736

Unclassified report

Descriptors: (*Boundary layer transition, Theory), Flat plate models, Pressure, Turbulence, Incompressible flow, Italy

Some recent investigations about the boundary layer, with pressure gradient, in the incompressible fluid flow along a flat, smooth plate, are briefly summarized. The results of those investigations are compared with the experimental ones found by the author. Some considerations are drawn on the Tollmien-Schlichting theory of instability, the transition Reynolds number, the origin of the spots and the outline of the turbulent boundary layer. (Author)

AD-629 213 Fld. 20/4, 20/13
CFSTI Prices: HC $2.60 MF $0.50
MICHIGAN UNIV ANN ARBOR
ON THE TRANSPORT PHENOMENA IN RARIFIED GASES,
by C. S. Wang Chang, and G. E. Uhlenbeck. 20 Feb 48, 23p. Contract NOrd-7924,

Unclassified report

Prepared in cooperation with Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab., Contract NOrd-7386, Rept. no. AOL/JHU/CM-443.

Descriptors: (*Gas flow, Transport properties), (*Transport properties, Gas flow), Molecular structure, Thermodynamics, Kinetic theory, Equations, Compressible flow

The Lorentz-Hilbert-Enskog method is used to explain on the basis of the molecular interaction laws the general Stokes-Navier equations for compressible media and to calculate at the same time the transport coefficients in terms of molecular quantities.

AD-629 243 Fld. 20/4
DUBLIN UNIV (EIRE) SCHOOL OF ENGINEERING
AN EXPERIMENTAL AND THEORETICAL ANALYSIS OF CYLINDRICAL LIQUID JETS SUBJECTED TO VIBRATION.
Revised ed.,
by P. D. McCormack, L. Crane, and S. Birch. 28 Aug 64, 18p. Contract AF-EOAR-76-63, Proj. AF-9711, Task 971101,
AFOSR 65-2049

Unclassified report

Revision of manuscript submitted 5 May 64.

Availability: Published in British Journal of Applied Physics v16 p395-409 1965. Copies to DDC users only.

Descriptors: (*Liquid jets, Stability), Jets, Velocity, Modulation, Vibration, Fluid mechanics

It is established that the Rayleigh-Weber capillary type instability on liquid jets may be triggered by velocity modulation at the injector. It is shown that by application of mechanical vibration in the appropriate frequency range, such velocity modulation can be induced. A second-order analysis is developed to cover the case of very small initiating modulation amplitudes. With finite velocity modulation it is demonstrated that considerable liquid bunching occurs which results in the formation of disks on the jet. A modified Rayleigh analysis is carried out which qualitatively covers characteristics observed in the region of finite velocity modulation. Vibration acceleration values of 200 g and more were found necessary to enter the region where the liquid bunching mechanism predominates over the surface tension mechanism. (Author)

AD-629 248 Fld. 20/4
AEROCHEM RESEARCH LABS INC PRINCETON NJ
CHEMICAL SCAVENGER PROBES IN NONEQUILIBRIUM GASDYNAMICS.
Revised ed.,
by D. E. Rosner, A. Fontijn, and S. C. Kurzius. 25 Sep 63, 3p. Contract AF 49 (638)-300,
AFOSR 65-2155

Unclassified report

Revision of manuscript submitted 17 Jul 63.

Availability: Published in AIAA Journal 1964. Copies to DDC users only.

Descriptors: (*Nonequilibrium flow, Gas analysis), (*Gas analysis, Sampling), Aerodynamics, Supersonic flow, Chemical reactions, Test methods

The scavenger rapidly and quantitatively reacts with the unstable species in the sampled gas to form one or more stable products, which can then be analyzed downstream by any one of a number of conventional techniques.

AD-629 284 Fld. 20/4, 16/4
CFSTI Prices: HC $2.60 MF $0.50
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
SLOSHING OF LIQUIDS IN CYLINDRICAL TANKS OF ELLIPTIC CROSS-SECTION.
Technical rept.,
by Wen-Hwa Chu. 26 Sep 58, 29p. Rept. no. TR-2,
Contract DA-23-072-ORD-1251, Proj. SwRI-43-768-2,

Unclassified report

See also AD-612 783.

Descriptors: (*Sloching, Tanks (Containers), (*Fuel tanks, Sloshing), Liquids, Cylindrical bodies, Mathematical analysis, Oscillations, Guided missiles

An analysis is made of the sloshing of liquids in partiallyfilled rigid cylindrical tanks of elliptic cross-section. By application of potential theory the forces and moments acting on the tank are determined for the case of translational and rotational excitation along or about the major and minor axes of the cross-section, and expressions for the resonant frequencies are found in terms of the roots of the derivatives of modified Mathieu functions. The lowest few resonant frequency parameters, as computed from those expressions, are compared with those of a circular cylinder having the same cross-sectional area. (Author)

AD-629 285 Fld. 20/4, 13/4
CFSTI Prices: HC $1.60 MF $0.50
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
SOME COMPARISONS OF SLOSHING BEHAVIOR IN CYLINDRICAL TANKS WITH FLAT AND CONICAL BOTTOMS.
Technical rept.,
by H. Norman Abramson, and Guido E. Ransleben,Jr.. 15 May 59, 18p. Rept. no. TR-4,
Contract DA-23-072-ORD-1251, Proj. SwRI-43-768-2,

Unclassified report

See also AD-612 784.

Descriptors: (*Sloshing, Tanks (Containers), Cylindrical bodies, Oscillation, Geometric forms

Some results obtained from sloshing experiments with rigid model cylindrical tanks in translation and having both flat and conical bottoms, are discussed and compared. On the basis of both total force and wall pressure distribution measurements, it is concluded that sloshing behavior in tanks with conical bottoms can be represented quite adequately by an 'equivalent' flat bottom (based on equal liquid volumes). (Author)

AD-629 301 Fld. 20/4
MANCHESTER UNIV (ENGLAND) DEPT OF MECHANICS OF FLUIDS
ONE-DIMENSIONAL COMPRESSION OF A COLLISIONLESS GAS,
by G. A. Bird. 30 Apr 64, 9p. Contract AF-EOAR-64-65,
AFOSR 65-2475

Unclassified report

Availability: Published in Journal of Fluid Mechanics v21 pt1 p183-91 1965. Copies to DDC users only.

Descriptors: (*Superaerodynamics, Compressible flow), (*Compressible flow, Superaerodynamics), Molecular beams, Temperature, Continuum mechanics, Gas flow, Shock waves, Great Britain

A highly rarefied gas, initially in equilibrium, is compressed by an infinite plane piston. The result-

ing flow is considered when the gas is unbounded and also when the gas is bounded by a second stationary wall. In the first case, the density ahead of the piston is specularly and diffusely reflecting surfaces. In the second case, the average temperature of the gas is found as a function of the wall separation for specularly reflecting surfaces. This (non-equilibrium) temperature is compared with that generated in the corresponding continuum flow which involves multiple shock wave reflexion. It is shown that, for a given average density gradient, the free molecule temperatures are very much higher than the continuum temperatures. (Author)

AD-629 312 Fld. 20/4, 6/16
CFSTI Prices: HC $3.00 MF $0.75
VIDYA DIV ITEK CORP PALO ALTO CALIF
LAMINAR FLOW REGIMES FOR RIGID-SPHERE SUSPENSIONS.
Final rept.,
by Alvin H. Sacks, and E. Glenn Tickner. 28 Feb 66, 79p. Rept. no. Vidya-213,
Contract AF 49 (638)-1491, Proj. AF-9781, Task 978101,
AFOSR 66-0412

Unclassified report

Descriptors: (*Laminar flow, Experimental data), (*Blood circulation, Experimental data), Colloids, Fluid mechanics, Analysis, Viscosity

An experimental study is made of the flow of density-matched rigid sphere suspensions in rigid cylindrical tubes at low tube Reynolds numbers (0.001 to 100). It is found that a number of distinct types of flow exist within the laminar range whose character is determined by particle concentration, ratio of particle diameter to tube diameter, and Reynolds number. These flows are consistent with those seen by other investigators and in some cases bear a strong resemblance to the flow in the living microcirculation. In particular, the phenomena of 'plasma skimming,' the 'tubular pinch effect,' and a random-type of unsteady 'tumbling' flow are each observed for particular combinations of the above variables. It is found that for particle concentrations between about 1 and 30 percent and ratios of particle-diameter to tube-diameter between 3/16 and 7/16, there is a dramatic change in flow regime at a tube Reynolds number of about 10. Below that value, particle interactions produce a complex, unsteady particle motion involving significant radial excursions. Above that value, particle interactions virtually cease, nearly all particles move at a constant velocity parallel to the tube axis, and no particles remain on the vessel wall. This change in flow regime is accompanied by a sudden drop in relative viscosity to approximately that predicted by the non-interaction theory of Einstein. It is shown that the fluid suspension is in all cases Newtonian and the motion is in all cases laminar. The particle interactions associated with the above phenomenon are therefore not to be confused with turbulence. (Author)

AD-629 321 Fld. 20/4
ROCHESTER UNIV N Y DEPT OF MECHANICAL AND AEROSPACE SCIENCES
STABILITY OF HAGEN-POISEUILLE FLOW,
by Martin Lessen, John A. Fox, Wamen V. Bhatand , and Ting-Yung Liu. 4 Feb 64, 2p.

Unclassified report

Availability: Published in The Physics of Fluids v7 n8 p1384-5 Aug 1964. Copies to DDC users only.

Descriptors: (*Stability, Laminar flow), (*Laminar flow, Stability), Equations of motion

AD-629 322 Fld. 20/4
ROCHESTER UNIV N Y DEPT OF MECHANICAL AND AEROSPACE SCIENCES
ON THE INVISCID STABILITY OF THE LAMINAR MIXING OF TWO PARALLEL STREAMS OF A COMPRESSIBLE FLUID,
by M. Lessen, J. A. Fox, and H. M. Zien. 15 Mar 65, 13p.

Unclassified report

Availability: Published in J. Fluid Mech. v23 pt2 p355-67 1965. Copies to DDC users only.

Descriptors: (*Jet mixing flow, Stability), (*Laminar flow, Compressible flow), Three-dimensional flow, Turbulence, Subsonic flow, Mathematical analysis

The inviscid stability of the laminar mixing of two parallel streams of a compressible fluid is investigated with respect to three-dimensional wavy disturbances. The flow is more unstable as the angle between the disturbance-wave-number vector and the principal-flow direction becomes larger. With three-dimensional disturbances, subsonic disturbances exist even at very high Mach number, and the flow is still unstable. However, it is also found that increasing the Mach number of the flow tends to stabilize the flow. (Author)

AD-629 323 Fld. 20/4
ROCHESTER UNIV N Y DEPT OF MECHANICAL AND AEROSPACE SCIENCES
THE INSTABILITY OF INVISCID JETS AND WAKES IN COMPRESSIBLE FLUID,
by M. Lessen, J. A. Fox, and H. M. Zien. 27 May 64, 15p.

Unclassified report

Supported in part by ONR.

Availability: Published in Journal of Fluid Mechanics v21 pt1 p129-43 1965. Copies to DDC users only.

Descriptors: (*Jets, Stability), (*Wake, Stability), Compressible flow, Two-dimensional flow, Axially symmetric flow, Numerical analysis, Subsonic flow, Supersonic flow, Turbulence

The instability of a two-dimensional jet with respect to three-dimensional disturbances and that of an axially symmetric jet with respect to azimuthally periodic disturbances are studied, for the inviscid flow of a compressible fluid. In both cases the undisturbed velocity is assumed to be uniform in the jet. It is shown analytically that a two-dimensional jet is unstable under small disturbances, either subsonic or supersonic. There is no upper limit in Mach number, as was found for a plane vortex sheet, above which the flow is completely stable. Numerical calculations for the eigenvalues for both the two-dimensional jet and the axially symmetric jet were made. The results indicate that the increase of Mach number tends to stabilize the flow. For the two-dimensional jet, the larger the angle between the direction of wave propagation and that of the main flow, the more the flow will be destabilized. For the axially symmetric jet, the flow is more unstable under azimuthally periodic disturbances than under rotationally symmetric ones, at small wave number. (Author)

AD-629 379 Fld. 20/4
CFSTI Prices: HC $4.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
MINIMUM PRESSURE ENVELOPES FOR MODIFIED NACA-66 SECTIONS WITH NACA A=0.8 CAMBER AND BUSHIPS TYPE I AND TYPE II SECTIONS.
Research and development rept.,
by Terry Brockett. Feb 66, 41p. Proj. S-F013-1109, Task 3802,
DTMB 1780

Unclassified report

Descriptors: (*Propeller blades, Cavitation), (*Airfoils, Pressure), Lift, Camber, Leading edge, Trailing edge, Mathematical analysis

Minimum pressure envelopes, computed for steady two-dimensional flow, with an empirical correction for viscosity, are presented in graphic form for three foils: NACA 66 (TMB modified nose and tail) thickness with the NACA a = 0.8 camberline, the BuShips Type I section and the BuShips Type II section. In addition, design charts for selecting an 'optimum' foil are included. A comparison of these foils, designed to have a favorable operating range of minimum pressures for a specified cavitation number and lift coefficient, shows the 66 (modified) form to provide a slightly wider margin for angle changes. Also with zero camber, the 66 (modified) section has a greater range of favorable minimum pressures than the other foils. (Author)

AD-629 416 Fld. 20/4, 12/1, 20/11
CFSTI Prices: HC $4.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
APPLIED MATHEMATICS AND MECHANICS (SELECTED ARTICLES).
18 Feb 66, 47p. Rept. no. FTD-TT-65-1778, TT 66-60722

Unclassified report

Unedited rough draft trans. of Prikladnaya Matematika i Medkhanika (USSR) v29 n1 p106-13, 141-55 1965.

Descriptors: (*Calculus of variations, Supersonic flow), (*Supersonic flow, Calculus of variations), (*Elastic shells, Theory), Equations of motion, Mechanics, USSR

Contents: Variation Problem of Three-Dimensional Supersonic Flows, by V. M. Borisov and On The Construction of Two-Dimensional Equations of the Theory of Elastic Thin Plates, by A. L. Gol'denveyzer and A. V. Kolos.

AD-629 471 Fld. 20/4, 14/5
CFSTI Prices: HC $2.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
DETERMINING THE DENSITY OF A GAS BEHIND A SHOCK WAVE FROM SHADOW PHOTOGRAPHY,
by A. N. Semenov. 20 Jan 66, 21p. Rept. no. FTD-TT-65-1385,
TT 66-60731

Unclassified report

Unedited rough draft trans. of Inzhenernyi Zhurnal (USSR) v4 n4 p743-50 1964.

Descriptors: (*Wake, Density), (*Shock waves, Spark shadowgraph photography), Gases, USSR, Measurement, Refraction, Gas flow

AD-629 499 Fld. 20/4
CINCINNATI UNIV OHIO
AN APPROXIMATE ANALYTICAL DERIVATION OF SKIN FRICTION AND HEAT TRANSFER IN LAMINAR BINARY BOUNDARY LAYER FLOW.
Revised ed.,
by Ting Yi Li, and Philip S. Kirk. 5 Feb 65, 23p.
Contract AF 33 (616)-8453, Proj. AF-7064, ARL 65-233

Unclassified report

Revision of manuscript submitted 30 Jul 64.

Availability: Published in International Journal of Heat and Mass Transfer v8 p1217-34 1965. Copies to DDC users only.

Descriptors: (*Skin friction, Laminar boundary layer), (*Heat transfer, Laminar boundary layer), (*Laminar boundary layer, Numerical analysis), Mass transfer, Aerodynamic heating, Atmosphere entry, Laminar flow, Approximation (Mathematics)

The paper presents an approximate analysis of the binary boundary-layer equations under conditions in which the external flow field pressure gradient is not zero, and the flow Mach number is not necessarily small. Expressions for the skin friction and heat-transfer coefficients are derived together with formulae exhibiting the explicit effects of injection. The results are compared with exact numerical solutions for a wide range of flow conditions, and the agreement is very close. (Author)

AD-629 533 Fld. 20/4
WASHINGTON UNIV SEATTLE
EFFECTS OF TURBULENCE IN HE II THERMAL COUNTERFLOW,
by J. T. Tough, W. D. McCormick, and J. G. Dash. 24 Jun 65, 8p. Contract AF-AFOSR-62-298,
AFOSR 66-0401

Unclassified report

Availability: Published in The Physical Review v140 n5A pA1524-8 Nov 29 1965. Copies to DDC users only.

Descriptors: (*Superfluidity, Helium), (*Turbulence, Helium), (*Helium, Hydrodynamics), Conduction (Heat transfer) Thermal conductivity, Damping, Laminar flow, Reynolds number, Viscosity, Liquefied gases

Measurement of the damping of small-amplitude transverse vibrations of a fine wire was used to investigate thermal counterflow of He II in wide channels of rectangular cross section. Below a critical heat current, the damping is independent of the current, and is dictated by laminar viscous flow of normal fluid. At higher heat currents, the damping increases above the subcritical value, and the excess damping has been studied as a function of parameters of the apparatus and liquid. The dependence of the magnitude of the critical heat current on temperature and channel width is described by a critical Reynolds number Rc=pVncd/eta approx. 1200, where Vnc is the normal fluid velocity corresponding to the critical heat current, d is the channel width, eta is the normal fluid viscosity, and p is the total density. Rc is independent of wire diameter and vibration frequency. The excess damping was found to fit a single empirical expression over a wide range of experimental parameters. An outstanding characteristic of the supercritical damping force is its dependence on the Reynolds number as (R-Rc) to the 1/2 power. (Author)

AD-629 577 Fld. 20/4
CFSTI Prices: HC $2.60 MF $0.50
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF MECHANICS
ON THE FLOW OF AN OSEEN-LIKE FLUID PAST A PARABOLOID OF REVOLUTION.
Technical rept.,
by Carl Kaplan. Feb 66, 27p. Contract AF 49 (638)-496, Proj. AF-9783, Task 978302,
AFOSR 66-0173

Unclassified report

Descriptors: (*Bodies of revolution, Fluid flow), (*Parabolic bodies, Fluid flow), (*Fluid flow, Bodies of revolution), Functions, Integrals, Shear stresses, Drag, Cylindrical bodies

The treatment of the problem of flow of an Oseen-like fluid past a paraboloid of revolution in three-dimensions follows closely the treatment of the corresponding problem for a parabolic cylinder in two-dimensions. The use of the concept of field modes reduces the problem to elementary considerations with no mathematical difficulties. Expressions for the components of fluid velocity at an arbitrary point in a meridian plane are obtained in closed form. The corresponding Stokes stream function is also obtained in closed form - the chief difference between this stream function and that for the parabolic cylinder being the replacement of the error function by the exponential integral. Expressions are derived for the shearing stress and the drag force and compared with the corresponding expressions for the parabolic cylinder. (Author)

AD-629 610 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
OKLAHOMA STATE UNIV STILLWATER SCHOOL OF CIVIL ENGINEERING
VISCOSITY STUDIES ON DISTILLED WATER AND WEAK SOLS OF POLYETHYLENOXIDE USING THE FALLING CYLINDER VISCOMETER AT OKLAHOMA STATE UNIVERSITY.
Technical rept.,
by E. Rune Lindgren. Oct 65, 36p. Rept. no. TR-3,
Contract Nonr-2595 (05),

Unclassified report

Descriptors: (*Water, Viscosity), (*Colloids, Viscosity), (*Epoxy plastics, Colloids), Turbulence, friction, Additives, Viscosimeters, Storage, Pipes, Cylindrical bodies, Theory

An experimental investigation was undertaken on the viscosity of weak sols of polyethylenoxide of molecular weight 4,000,000 in distilled water. At 0.01% concentration the viscosity is about 5% higher than for distilled water. Thus, remarkable reduction of turbulent energy losses observed for concentrations of 0.002 - 0.006% does occur without noticeable viscosity changes. The investigation revealed that the standard theory for the falling cylinder viscometer appears to be in error. (Author)

AD-629 625 Fld. 20/4
CALIFORNIA INST OF TECH PASADENA
UNTERSUCHUNGEN UBER DAS FLATTERN EINES DUNNWANDIGEN, KREISRUNDEN ZYLINDERS ENDLICHER LANGE IN UBERSCHALLSTROMUNG (INVESTIGATION IN FLUTTER OF THIN WALL CIRCULAR CYLINDERS OF FINITE LENGTH IN SUPERSONIC STREAMS),
by Hans Krumhaar. 1963, 10p. Contract AF-AFOSR-352-63,
AFOSR 65-2473

Unclassified report

Availability: Published in Sonderdurck aus dem Jahrbuch der WGLR p306-14 1963. Copies to DDC users only.

Descriptors: (*Structural shells, Flutter), (*Cylindrical bodies, Flutter), (*Flutter, Cylindrical bodies), Supersonic flow, Mathematical analysis

A short review is given of flutter investigations for a thin cylindrical shell of finite length in a supersonic air stream with restriction to axisymmetrical modes. Using the linearized Timoshenko shell equations and the linear piston theory, the flutter problem is reduced to a nonself-adjoint, ordinary eigen-value problem. This problem is solved without further approximations. Using these results flutter boundaries for the cylinder are derived. The reliability of the underlying physical assumptions can then be investigated by comparison with experimental results. (Author)

AD-629 629 Fld. 20/4
CFSTI Prices: HC $8.60 MF $0.75
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
SOLUTION OF A NON-LINEAR BOUNDARY VALUE PROBLEM IN FLUID MECHANICS USING A VARIATIONAL METHOD,
by Alexander Pal. Sep 65, 81p. Rept. no. pibal-890,
Contract DA-44-177-AMC-91 (T)

Unclassified report

Descriptors: (*Fluid mechanics, Boundary value problems), (*Boundary value problems, Fluid mechanics), Equations, Theorems, Analysis of variance, Integrals, Jets, Two-dimensional flow

It is shown that the generalized Dirichlet integral has similar variational properties as the ordinary one, i.e. the solution of the corresponding first boundary value problem makes it minimum for given boundary values. It is shown that the compound variational functional introduced has a lower bound for a broad function class, ('admissible' functions) thus permitting the formulation of the variational problem as a minimum problem. A non-linear integral equation is derived involving only the boundary values of Q. This integral equation is essentially equivalent to the boundary value problem. With the aid of this integral equation the asymptotic estimates near 0 are improved and differentiability properties of Q on the boundary are proved.

AD-629 643 Fld. 20/4
CFSTI Prices: HC $4.00 MF $0.75
RAND CORP SANTA MONICA CALIF
AERODYNAMICS OF BODIES OF REVOLUTION,
by Nikolai F. Krasnov. Aug 65, 104p. Rept. no. LT-65-15,
TT 66-60740

Unclassified report

Trans. of meno. Aerodinamika Tel Vrashcheniya, 1964.

Descriptors: (*Bodies of revolution, Aerodynamics), (*Aerodynamics, Bodies of revolution), USSR, Aerodynamic characteristics, Mathematical analysis, Vortices, Boundary layer, Angle of attack

AD-629 666 Fld. 20/4
STANFORD UNIV CALIF DIV OF ENGINEERING MECHANICS
TWO-DIMENSIONAL HYPERSONIC STAGNATION FLOW AT LOW REYNOLDS NUMBERS,
by T. K. Fannelop, and I. Flugge-Lotz. 1 Nov 65, 18p. Contract AF-AFOSR-62-242 ,AF-AFOSR-235-63
AFOSR 65-2332

Unclassified report

Availability: Published in Sonderdurck aus Zeitschrift fur Flugwissenschaften v13 n8 p282-96 1965. Copies to DDC users only.

Descriptors: (*Hypersonic flight, Boundary layer), Stagnation point, Two-dimensional flow, Reynolds number, Tables, Heat transfer

An accurate boundary-layer analysis for hypersonic high altitude flight requires consideration of second-order (low Reynolds-number) effects. In the case of viscous flow over a cylinder with finite nose radius the second-order effects are found to be those arising from wall curvature, from velocity slip and temperature jump at the wall and from displacement-thickness interaction. A complete theory which accounts for all these effects has been given by M. D. Van Dyke. Local solutions to Van Dyke's equations for the stagnation region can be obtained by an expansion in powers of s (the arclength from the stagnation point) without use of auxiliary transformations. These local solutions become independent of the free stream conditions when the exact Sutherland viscosity law is approximated by a power law. A large number of solutions for various wall-to-stagnation-temperature ratios and power-law exponents are tabulated. These solutions are sufficiently accurate (5 to 6 decimal places in most cases) to be used as initial values for step-by-step numerical procedures for solving the first- and second-order boundary-layer equations. Perfect-gas relationships are used in the analysis and the solutions are strictly applicable only when the stagnation temperature is not too high. When the wall is cold the heat-transfer rate at the stagnation point is found to be reduced due to the second-order effects. The calculated reductions are, however, much smaller than the measured reductions reported by Tewfik and Giedt, but they agree with Lenard's theoretical results. (Author)

AD-629 690 Fld. 20/4, 20/10
LIEGE UNIV (BELGIUM)
RELATIVISTIC EFFECTS IN STATISTICAL HYDRODYNAMICS,
by Ph de Gotfal, and I. Prigogine. 13 Nov 64, 13p. Contract AF-EOAR-52-64 ,AF-EOAR-61-68
AFOSR 66-0393
Unclassified report

Availability: Published in Physica v31 p677-87 1965. Copies to DDC users only.

Descriptors: (*Hydrodynamics, Relativity theory), (*Statistical mechanics, Hydrodynamics), Electrons, Motion, Equations of motion, Gases, Belgium

A classical relativistic electron gas and the effect of the particle interaction on the macroscopic behaviour of the system are studied. It is shown that due to the non validity of the principle of action and reaction the field surrounding the particles acts as a reservoir of impulsion and energy for the matter; new kinds of motion are permitted due to a source term appearing in the equation of hydrodynamics. (Author)

AD-628 936 See Fld. 20/1

AD-629 031 See Fld. 4/1

AD-629 039 See Fld. 11/8

AD-629 045 See Fld. 7/4

AD-629 137 See Fld. 20/13

AD-629 214 See Fld. 20/1

AD-629 275 See Fld. 13/4

AD-629 328 See Fld. 19/4

AD-629 414 See Fld. 14/2

AD-629 417 See Fld. 20/9

AD-629 420 See Fld. 20/13

AD-629 441 See Fld. 1/2

AD-629 472 See Fld. 7/4

AD-629 475 See Fld. 13/11

AD-629 536 See Fld. 20/13

20/5. MASERS AND LASERS

AD-628 941 Fld. 20/5, 20/1, 20/12, 20/3, +
CFSTI Prices: HC $1.60 MF $0.50
MICROWAVE LAB STANFORD UNIV CALIF
MICROWAVE RESEARCH.
Quarterly status rept. no. 27, 1 Aug-31 Oct 65,
by M. Chodorow. Feb 66, 17p. Rept. no. ML-1410,
Contract Nonr-225 (48),
Unclassified report

Descriptors: (*Microwave frequency, Scientific research), (*Acoustics, Amplifiers), (*Lasers, Scientific research), Optics, Semiconductors, Oscillation, Plasma physics, Theory, Ferromagnetic materials, Metals

Contents: acoustic wave amplification studies, optical maser research, tunable lasers, geometrical optics of acoustic waves, oscillations in semiconductors, theory of nonuniform plasmas, bulk instabilities in ferromagnetic metals.

AD-629 158 Fld. 20/5, 20/6
TRG INC MELVILLE N Y
SESSION P-3: QUANTUM ELECTRONICS GENERATION. P-3.3: FREQUENCY STABILIZATION OF GAS LASERS,
by W. R. Bennett,Jr., S. F. Jacobs, J. T.LaTourrette, and P. Rabinowitz. 1964, 2p. Contract AF 49 (638)-673,
AFOSR 65-2795
Unclassified report

Prepared in cooperation with Yale Univ., New Haven, Conn. Presented at Northeast Electronics Research and Engineering Meeting 4-6 Nov 64.

Availability: Published in NEREM Record 1964. Copies to DDC users only.

Descriptors: (*Lasers, Frequency stabilizers), Quantum mechanics, Electron transitions, Stabilization, Optics

AD-629 159 Fld. 20/5, 20/6
TRG INC MELVILLE N Y
COLLISION LASERS,
by Gordon Gould. 1965, 11p. Contract AF 49 (638)-673,
AFOSR 65-2808
Unclassified report

Availability: Published in Applied Optics Supplement 2 of Chemical Lasers p59-67 1965. Copies to DDC users only.

Descriptors: (*Lasers, Gas discharges), (*Gas discharges, Lasers), Excitation, Electrons, Electron transitions, Quantum mechanics, Optics

Reliance on spontaneous emission to relax the lower level limits the efficiency and the power output from gas discharge lasers. The level spacing required for an untrapped radiative cascade places the laser levels well up in the energy level structure. The consequence is low quantum efficiency, a small fraction of electrons with the necessary energy for excitation, and parasitic loss through excitation of lower levels. A judicious combination of inelastic electron-atom and atom-atom collisions for excitation and relaxation can maintain a population inversion in appropriate atoms. This is possible because transfer rates between levels due to atom-atom collisions are small if the energy defect substantially exceeds the average kinetic energy. Thus collisions with other atoms can selectively relax the lower level to other nearby levels without reducing the upper level population. In favorable cases laser power of order 1 W/ is expected with an efficiency greater than 10%. Temperatures above 1000 degrees are needed to produce a monatomic gas of most elements with suitably spaced low-lying levels. Two such elements are manganese and lanthanum. Mn can be contained in alumina tubing at 1350 degrees; La in tantalum tubing at 1800 degrees. Diffusion to cold windows is prevented by a noble buffer bas. Apparatus for testing each of these systems has been constructed. Xenon test oscillations have been observed in the apparatus at the working temperature. Measurements of fluorescence in the prospective laser transitions are being carried out. (Author)

AD-629 161 Fld. 20/5, 20/6
TRG INC MELVILLE N Y
STRONG 3.27-UPSILON LASER OSCILLATION IN XENON,
by W, T. Walter, and S. M. Jarrett. 16 Apr 64, 4p. Contract AF 49 (638)-673,
AFOSR 65-2810
Unclassified report

Availability: Published in Applied Optics v3 n6 p789-90 Jun 1964. Copies to DDC users only.

Descriptors: (*Lasers, Gas discharges), (*Gas discharges, Lasers), (*Xenon, Lasers), Quartz, Pipes, Gases, Excitation, Electron transitions, Quantum mechanics, Optics

This letter describes some studies of stimulated emission of a pure xenon discharge contained in a quartz tube with quartz Brewster angle windows and external reflectors. (Author)

AD-629 170 Fld. 20/5, 13/8, 17/8, 20/2
CFSTI Prices: HC $1.60 MF $0.50
LINDE DIV UNION CARBIDE CORP EAST CHICAGO IND
PRODUCTION ENGINEERING MEASURE FOR RUBY LASER RODS.
Quarterly progress rept. no. 2, 1 Oct-31 Dec 65,
by M. K. Towne, and B. H. Heise. 31 Dec 65, 16p. Contract DA-36-039-AMC-06168 (E),
Unclassified report

See also AD-626 212.

Descriptors: (*Lasers, Ruby), (*Ruby, Crystal growth), (*Crystal growth, Ruby), Manufacturing methods, Rods, Range finding

The document reports progress toward improving the ruby crystal growth process for the manufacture of Rangefinder laser rods. Engineering studies during the quarter were concentrated on the effects on individual variables. Definite relations between boule quality and standoff, boule diameter and gas ratios have emerged. Necessity for extended growth runs and repetition of many tests has caused the growth study to slip one and one-half months behind schedule but current use of shorter growth runs and introduction of an improved feeder six months ahead of schedule will compensate for this slippage. Improved control of the distance between burner and boule cap by an automatic photosensitive device has been extended to both growth stations allocated for contract work. A continuous powder feed has been installed on one station and has operated satisfactorily. Evaluation of boules has been based primarily upon fringe pattern and passive beam divergence. Equipment for active laser testing is not yet available and is cause for a delay in shipment of Engineering Test Samples. (Author)

AD-629 426 Fld. 20/5, 20/12
CFSTI Prices: HC $2.60 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
OPTIMIZATION OF THE GALLIUM ARSENIDE INJECTION LASER FOR MAXIMUM POWER OUTPUT.
Technical rept.,
by Juri Vilms, Lothar Wandinger, and Kenneth L. Klohn. Nov 65, 29p. Rept. no. ECOM-2613, Proj. DA-1P6-22001-A-056, Task 1P6-22001-A-056-04,
Unclassified report

Descriptors: (*Lasers, Semiconductors), (*Semiconductors, Lasers), (*Gallium compounds, Arsenides), Experimental design, Mathematical models, Solid state physics, Optimization

The operating temperature of an injection laser is determined by the difference between the electrical input power and the coherent light output power, and by the details of heat conduction away from the active region. Since the efficiency of the coherent light generation is a decreasing function of temperature, a maximum exists in the curve of output versus input power. A mathematical model of the injection laser is employed to investigate how this maximum output power varies as a function of several design parameters of the injection laser. The optimum design is presented for the case of continuous operation in a 77K environment and discuss pulsed operation of low-duty cycle in a 300K environment.

AD-629 445 Fld. 20/5
COLUMBIA RADIATION LAB NEW YORK
PHOTON ECHOES.
by I. D. Abella, N. A. Kurnit, and S. R. Hartmann. 3 Aug 65, 16p. Contract DA-31-124-ARO (D)-224 ,DA-28-043-AMC-00099 (E)
AROD 4231:6
Unclassified report

Availability: Published in the Physical Review v141 n1 p391-406 Jan 1966. Copies to DDC users only.

Descriptors: (*Photons, Pulses (Electromagnetic)), (*Lasers, Light pulses), Emissivity, Ruby, Dipole moments, Oscillation, Polarization, Propagation, Chromium, Aluminum, Magnetic fields, Relaxation time, Atomic energy levels, Electron transitions

Experiments are described in which a dilute ruby crystal is found to emit spontaneously a short pulse of light, the photon echo, at a time of about pi sub s after irradiation by two successive ruby-laser pulses separated by pi sub s. The phenomenon is explained in terms of a macroscopic oscillating electric dipole moment, which is momentarily reformed at the time the photon echo is observed. The analysis predicts the echo polarization as well as the propagation direction relative to the input pulses. A necessary condition for obtaining echoes in ruby is the application of a moderate magnetic field close to the optic axis of the crystal, and a simple model based on Cr (3+)-Al interactions is offered to account for this magnetic-field behavior. The relaxation time of the echo is found to exceed 250 nsec at 4.2K but to be less than 70 nsec at 14K, and is thought to be due to phonon -induced transitions in the excited doublet E (E) level. Multiple echo formation is also described. (Author)

AD-629 457 Fld. 20/5, 20/6
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
NOTE ON RADIATIVE CORRECTIONS TO THOMSON SCATTERING IN INTENSE LASER BEAMS,
by J. H. Eberley. 4 Oct 65, 2p. Contract DA-ARO (D)-31-124-G569, AROD 4965:10

Unclassified report

Availability: Published in Physics Letters v19 n4 p284-5 Nov 1 1965. Copies to DDC users only.

Descriptors: (*Lasers, Scattering), Quantum mechanics, Field theory, Light Optics

AD-629 503 Fld. 20/5, 17/2
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
PULSE-CODE MODULATION MULTIPLEX TRANSMISSION OVER AN INJECTION LASER TRANSMISSION SYSTEM,
by E. J. Schiel, E. C. Bullwinkel, and R. B. Weimer. 18 Oct 65, 2p.

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p2140-1 Dec 1965. Copies to DDC users only.

Descriptors: (*Lasers, Data transmission systems), (*Data transmission systems, Lasers), (*Pulse code modulation, Multiplex), Light communication systems

AD-628 926 **See Fld. 5/1**

AD-628 946 **See Fld. 5/1**

AD-629 154 **See Fld. 20/2**

AD-629 688 **See Fld. 20/12**

AD-629 689 **See Fld. 20/12**

20/6. OPTICS

AD-629 030 Fld. 20/6, 20/12, 7/4
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
MODERN SPECTROSCOPY OF SOLIDS,
by D. L. Dexter. 1965, 5p. Contract AF-AFOSR-611-64, Proj. AF-9761 Task 976101, AFOSR 66-0238

Unclassified report

Availability: Published in Japanese Journal of Applied Physics, v4 p609-12 suppl 1 1965. Copies to DDC users only.

Descriptors: (*Solids, Optical properties), (*Gamma-ray spectroscopy, Solids), (*X-ray spectroscopy, Solids), (*Ultraviolet spectroscopy, Solids), (*Spectroscopy, Solids), (*Infrared spectroscopy, Solids), Reviews

A qualitative review is presented of selected recent developments in the study of the optical properties of solids from the gamma-ray region to the far infra-red. (Author)

AD-629 153 Fld. 20/6, 20/14
CFSTI Prices: HC $1.00 MF $0.50
VARIAN ASSOCIATES PALO ALTO CALIF
INVESTIGATION OF ELECTRONIC INTERACTION WITH OPTICAL RESONATORS FOR MICROWAVE GENERATION AND AMPLIFICATION.
Quarterly rept. no. 3, 16 Jul-15 Oct 65,
by H. Jory F5 Oct 65, 24p. Rept. no. Engineering-329-3Q,
Contract DA-28-043-AMC-00480 (E), Proj. DA-1G6-22001-A-055-04,

Unclassified report

Descriptors: (*Microwaves, Production), (*Resonators, Optics), Microwave oscillators, Electron beams, Design

Calculations of interaction parameters were made for a high velocity rotating beam in a TE sub n11 cylindrical cavity. It is observed that the strength of the interaction is essentially constant for all values of n above n = 2. Therefore this approach has considerable interest for millimeter wave operation. The design of an experimental 4.5 mm wavelength oscillator based on this interaction is discussed. (Author)

AD-629 704 Fld. 20/6, 15/4
CFSTI Prices: HC $1.00 MF $0.50
ARMY ENGINEER GEODESY INTELLIGENCE AND MAPPING RESEARCH AND DEVELOPMENT AGENCY FORT BELVOIR VA
TWO APPROACHES TO A PORTABLE COLOR-MEASURING SYSTEM.
Research note,
by Kenneth D. Robertson. Jan 66, 25p. Rept. no. GIMRADA RN-15,

Unclassified report

Descriptors: (*Colors, Measurement), (*Spectrophotometers, Portable), (*Reflectometers, Portable), Design, Light, Cadmium compounds, Sulfides

Two approaches to color measurement are presented, the spectrophotometer and the reflectometer. Descriptions are given of two portable instruments, one of each type. The first instrument was built using a flashlight lamp as light source, a wedge interference filter as monochrometer, and a cadmium sulphide photoresistor as a detector. The second instrument was built with three filters which provided the tristimulus curves of the CIE standard observer, a flashlight lamp, and three barrier layer cells as detectors. (Author)

AD-629 710 Fld. 20/6
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
RARE GAS CONTINUUM LIGHT SOURCES FOR PHOTOELECTRIC SCANNING IN THE VACUUM ULTRAVIOLET.
Physical sciences research papers,
by R. E. Huffman, J. C. Larrabee, and Y. Tanaka. 11 Jun 65, 12p. Rept. no. afcrl-PSRP-184,AFCRL-66-2
Proj. AF-8627, Task 862701,

Unclassified report

Availability: Published in Applied Optics v4 n1 p1581-8 Dec 1965. Copies to DDC users only.

Descriptors: (*Helium group gases, Ultraviolet spectroscopy), Thyratrons, Continuous spectrum, Helium, Argon, Krypton, Xenon, Vacuum, Spectra (Ultraviolet)

The vacuum ultraviolet continua of the rare gases helium (580-1100A), argon (1050-1550 A), krypton (1250-1800 A), and xenon (1480-2000 A) have been excited in a condensed discharge using a recently developed thyratron modulator excitation unit which gives sufficient intensity for photoelectric scanning at a bandwidth of 0.25A. The optimum conditions for excitation have been studied. The continua excited in this manner have been compared with microwave-excited continua and found to be significantly more intense for argon and about the same intensity for krypton and xenon. It was not possible to obtain the helium continuum using microwave excitation. Time-resolved measurements of the light emission, current, and voltage made for these continua show that the light emission may begin either before or after the current pulse. (Author)

AD-629 065 **See Fld. 7/5**

AD-629 081 **See Fld. 4/1**

AD-629 123 **See Fld. 4/1**

AD-629 127 **See Fld. 4/1**

AD-629 158 **See Fld. 20/5**

AD-629 159 **See Fld. 20/5**

AD-629 161 **See Fld. 20/5**

AD-629 187 **See Fld. 20/12**

AD-629 242 **See Fld. 17/2**

AD-629 252 **See Fld. 7/4**

AD-629 457 **See Fld. 20/5**

AD-629 541 **See Fld. 20/10**

AD-629 586 **See Fld. 9/2**

AD-629 590 **See Fld. 14/2**

AD-629 715 **See Fld. 7/4**

20/7. PARTICLE ACCELERATORS

AD-628 928 Fld. 20/7, 14/2
CFSTI Prices: HC $5.60 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
THE NRL CYCLOTRON PROGRAM, REPORT OF PROGRESS, SEPTEMBER 1, 1965.
Interim rept.,
by R. O. Bondelid, R. G. Allas, C. D. Bond, J. A. Eisele, and J. L. Toth. 1 Sep 65, 55p. Rept. no. NRL-6366 ,Cyclotron-2
Proj. RR-002-06-41-5008,

Unclassified report

Descriptors: (*Cyclotrons, Naval research laboratories), Cyclotron magnets, Construction, Particle accelerator techniques, Particle beams, Ion beams, Control systems

The cyclotron, an improved version of the Oak Ridge Isochronous Cyclotron (ORIC), will furnish large ion currents (up to 1 mA) with variable energy (from 5 to 75 MeV for protons), and a large choice of ion species for research in nuclear physics. The magnet gap of the NRL cyclotron has been changed from the vertical plane used in the ORIC to the horizontal plane because an analysis indicates that there will be a large improvement

in the intensity of the energy-analyzed beam. This and other changes based on operating experience at the ORIC were incorporated in the scope of work given to the engineering firm who prepared bid packages, and assisted in the procurement of components, and in the critical path management scheduling of the cyclotron program. An automated system, utilizing a Hall-plate which is positioned by a tape-controlled table, has been developed to map the magnetic field of the cyclotron. Computational techniques have been developed for analysis of various ion-optic problems. Preliminary analysis of the combination of an energy-analyzing magnet, switching magnets, and quadrupoles has been performed so that the beam can be brought into any one of eleven proposed beam paths. Detailed design of three beam paths which will be instrumented initially has been completed. A major feature of the cyclotron beam-transport system is an 80-ton, 135-degree, 9-ft-radius energy-analyzing magnet which has an energy resolution better than 5000. (Author)

AD-629 025 Fld. 20/7, 9/5
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
FREQUENCY MODULATION OF LARGE CAVITIES.
Revised ed.,
by K. B. Rajangam, F. Hai, and K. R. MacKenzie.
8 Mar 65, 4p. Contract AF-AFOSR-567-64,
Proj. AF-9767 Task 976703,
AFOSR 65-2147

Unclassified report

Revision of manuscript received 26 Jan 65.

Availability: Published in Review of Scientific Instruments, v36 n6 p794-6 Jun 1965. Copies to DDC users only.

Descriptors: (*Frequency modulation, Particle accelerator techniques), Particle accelerator components, Capacitors, Rotation, Models (Simulations), Ion beams, Modulators, Cavitation

A model study is described in which a rotating capacitor is coupled to a large re-entrant cavity. The size and capacitive loading (about 500 pF) are such as to make modulation by ferrites or braodband amplifiers difficult and expensive. A nominal frequency range of 3 to 1 is achieved with a single-plate six-bladed rotor. On a possible full-scale cavity with a range of approximately 9 to 3 Mc, the data are scaled to a voltage of 5 kV peak for rf power requirements of 1 to 4.4 kW. (Author)

20/8. PARTICLE PHYSICS

AD-628 912 Fld. 20/8
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
ABSORPTION SPECTRA OF H2 IN THE VACUUM -ULTRAVIOLET REGION. III. POTENTIAL-ENERGY CURVES FOR THE B SINGLET-SIGMA (PLUS)U, C SINGLET-PIU, B SINGLET-SIGMA (PLUS)U, AND D SINGLET-PIU STATES.
Physical sciences research papers,
by Takeshi Namioka. 14 May 65, 15p. Rept. no. AFCRL-PSRP-176 ,AFCRL-65-879
Proj. AF-8627, Task 862701,

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n5 p1636-44 1 Sep 1965. Copies to DDC users only.

Descriptors: (*Hydrogen, Atomic energy levels), Graphics, Absorption spectrum, Diatomic molecules, Dissociation, Perturbation

The potential-energy curves for the B, C, B', and D states of the H2 molecule have been calculated from experimental spectroscopic data with the use of the Rydberg-Klein-Rees (R-K-R) method. The theoretical curve for the C state given by Kolos and Wolniewicz shows excellent agreement with the R-K-R curve over the whole range of internuclear distances. From these two curves and experimental evidence, it is now evident that the C state does have a potential hump at about 100/cm above its dissociation limit at the internuclear distance of about 4.76 A. Although some difficulties have been encountered in constructing the potential-energy curve for the B' state in the vicinity of the dissociation limit, there is an indication that the right limb of the R-K-R curve could provide a limiting curve of the form required to explain the observed limiting curve for the dissociation continuum. Through these studies it was also found that the last vibrational levels of the states B and B' are most probably v=36 and v=8, respectively. In Part II, the predissociation occurring in the D state was classified as the case beta to the 0 power. (Author)

AD-628 932 Fld. 20/8
CFSTI Prices: HC $7.60 MF $0.75
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
INELASTIC SCATTERING AT 45.5 MEV PROTONS FROM BERYLLIUM AND CARBON.
Technical rept.,
by Edward Petersen. Jan 66, 76p. Rept. no. TR-P-74,
Contract Nonr-233 (44),

Unclassified report

Descriptors: (*Carbon, Proton scattering), (*Beryllium, Proton scattering), Inelastic scattering, Differential cross section, Experimental data, Proton beams, Cyclotron, Test methods

The differential cross sections for the excitation of nine levels of carbon and one level of beryllium are reported for 35 angles from 15 to 150 degrees. The results for the 2.43 MeV level of beryllium and the 4.4 and 9.6 MeV levels of carbon have an average relative accuracy of 3% while the 7.6, 10.8, 11.8, 12.7, 14.0, 15.1, and 16.1 MeV levels of carbon have an average accuracy of 10%. The cross sections change by one to three orders of magnitude from forward to backward angles. Levels at 13.3 and 16.6 MeV in Carbon were not observed. The experimental apparatus is described, and the 2.43, 4.4, 7.6, and 9.1 MeV angular distributions are compared with distorted wave calculations. (Author)

AD-629 020 Fld. 20/8
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
ABSORPTIVE CORRECTIONS AND FORM FACTORS IN THE PERIPHERAL MODEL,
by Gordon L. Shaw, and Myron Bander. 9 Apr 65, 9p. Contract AF 49 (638)-1389, Proj. AF-9751, Task 975101,
AFOSR 65-2097

Unclassified report

Availability: Published in The Physical Review, v139 n4B pB956-62 Aug 23, 1965. Copies to DDC users only.

Descriptors: (*Meson reactions, Theory), (*Pions, Meson reactions), Nucleons, Meson bombardment, Meson scattering, Elastic scattering, Absorption, Nuclear spins

Absorptive corrections applied to the peripheral model have provided a relatively successful interpretation of a variety of high-energy production processes. There exist, however, a number of difficulties associated with these calculations. This paper considers the reaction pion + nucleon to RHO meson + nucleon, which is dominated by pion exchange, in order to study the following three ambiguities: (1) the actual dependence of the absorptive corrections on the initial-and final-state elastic-scattering phase shifts, (2) the role of a form factor, and (3) the numerical values of the finalstate elastic-scattering phase shifts. The comparison of the calculation made with the experimental data, in particular the density matrix of the RHO meson, leads to the following results. The j = 1/2 partial waves must be totally suppressed by the absorptive corrections and the form factor must play a very minor role in order to fit the observed deviation of the RHO meson's density matrix from that predicted by the exchange of a pion in the peripheral model. Any form factor associated with pion exchange is expected to have a weak t dependence, since there exists no resonance with the appropriate quantum numbers (to couple to the pion) with energy approx. < 1.3 bev. Author)

AD-629 183 Fld. 20/8
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
BOR'i RECIPROCITY PRINCIPLE AND UNITARY SYMMETRY,
by Ernest E. H. Shin. 29 Jun 64, 5p. Contract AF 49 (638)-1468,
AFOSR 65-2578

Unclassified report

Availability: Published in Journal of Mathematical Physics v6 n8 p1307-9 Aug 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, Field theory), (*Field theory, Elementary particles), Operators (Mathematics), Nuclear models, Tensor analysis, Transformations (Mathematics), Compatibility

In view of the past attempts by Born et al. to explain elementary particles using the Born reciprocity principle as a postulate and of the recent success of unitary symmetry schemes, it is sought to establish a contact between the reciprocity principle and unitary symmetry in connection with the problem of elementary particles. (Author)

AD-629 201 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS.
Annual summary rept. no. 2, 1 Oct 64-31 Dec 65,
by M. Balkanski. 31 Dec 65, 9p. Contract AF 61 (052)-757,
ARL 66-0036

Unclassified report

Descriptors: (*Chemical compounds, Electron transitions), Atomic structure, Atomic energy levels, Magneto-optic effect, Plasma physics, Photons, Phonons, Cadmium compounds, Sulfides, Cadmium alloys, Selenium alloys, Infrared spectroscopy, France

Efforts have been developed as well in theoretical as in experimental fields, towards the understanding of fundamental processes in the II-VI compounds. Studies on the fundamental electronic transitions are developed through the Faraday Rotation, plasma reflectivity and magnetooscillatory effects, and studies on the lattice dynamics and photon-phonon interaction are developed through group theoretical investigation and far infrared spectrometry. (Author)

AD-629 236 Fld. 20/8, 7/4
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
MOSSBAUER EFFECT IN DY161 IN METALLIC DYSPROSIUM, DYFE2, AND DYAL2,
by S. Ofer, M. Rakavy, E. Segal, and B. Khurgin.
4 Nov 64, 6p. Contract AF-EOAR-24-64,
AFOSR 65-2562

Unclassified report

Availability: Published in The Physical Review v138 n1A pA241-6 Apr 5 1965. Copies to DDC users only.

Descriptors: (*Mossbauer effect, Dysprosium), (*Dysprosium, Mossbauer effect), Dysprosium alloys, Iron alloys, Aluminum

alloys, Intermetallic compounds, Absorption spectrum, Gamma-ray spectra, Hyperfine structure, Magnetic properties, Chemical bonds, Nuclear moments, Israel

The recoilless absorption spectra of the 26-keV gamma rays from Dy (161m) in Dy (161) situated in Dy metal, DyFe2, and DyAl2 were measured at various temperatures. A value of (-825 plus or minus 30) Mc/sec was found for the magnetic hyperfine constant of the ground state of Dy (161) in Dy metal at 20K. This value is in very good agreement with the 'free-ion' value calculated for the Dy (34) ions in the fully magnetized state from data on electron spin resonance in dilute salts. The internal magnetic field acting on the Dy nucleus in DyFe2 at magnetic saturation is (14 plus or minus 2)% higher than in Dy metal. The magnetic field acting in DyAl2 at magnetic saturation is the same, within the experimental errors, as in Dy metal. The ratio of the magnetic moments of the 26-keV level and the ground state of Dy (161) was found to be -1.19 plus or minus 0.05. An isomeric shift of (2.5 plus or minus 0.4) mm/sec was found between Dy metal and Dy2O3 absorbers. The isomeric shifts of DyAl2 and DyF2 absorbers relative to a Dy2O3 absorber were found to be (0.4 plus or minus 0.4) mm/sec. (Author)

AD-629 244 Fld. 20/8
CAMBRIDGE UNIV (ENGLAND) DEPT OF APPLIED MATHEMATICS AND THEORETICAL PHYSICS
ANALYTIC PROPERTIES OF PARTIAL-WAVE AMPLITUDES FOR PRODUCTION PROCESSES,
by J. G. Cordes. 17 Feb 65, 12p. Contract AF-EOAR-79-63,
AFOSR 65-2784

Unclassified report

Availability: Published in Il Nuovo Cimento v39 (s10) p157-68 1 Sep 1965. Copies to DDC users only.

Descriptors: (*Pair production, Mathematical analysis), Particle trajectories, Nuclear physics

The singularities present on the physical sheet in a partial-wave projection of the five-point function, due to normal thresholds in crossed channels, are determined. The problem of obtaining cut-plane analyticity in a single variable for the partial-wave amplitude is discussed. (Author)

AD-629 257 Fld. 20/8
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
ORIGIN OF ANOMALOUS SURFACE REFLECTION OF X RAYS,
by A. N. Nigam. 15 Dec 64, 5p. Contract AF 49 (638)-402,NSF-G-9639 Proj. AF-9761, Task 976103

Unclassified report

Availability: Published in Physical Review v138 n4A pA1189-91 May 17 1965. Copies to DDC users only.

Descriptors: (*X-rays, Mirrors), Reflection, Surface properties, Diffraction, X-ray spectroscopy

The anomalous surface reflection of x rays from 'clean' mirrors, reported by Yoneda (Phys. Rev. 131:2010, 1963) is shown to be primarily due to the horizontal angular divergence of the incident beam itself. (Author)

AD-629 283 Fld. 20/8
STANFORD UNIV CALIF DEPT OF PHYSICS
PROPERTIES OF A MASSIVE NEUTRAL GAUGE PARTICLE,
by Y. Fujii. 7 Dec 64, 8p. Contract AF 49 (638)-1389,
AFOSR 65-2786

Unclassified report

Availability: Published in The Physical Review v138 n2B pB423-9 26 Apr 1965. Copies to DDC users only.

Descriptors: (*Elementary particles, Nuclear properties), (*Nuclear properties, Elementary particles), Baryons, Mesons, Pions, Nucleons, Field theory, Nuclear reactions

The properties of a massive neutral vector particle were investigated which is assumed to be gauge particle associated with the baryon number and to bear strong interactions. The strong resemblance to quantum electrodynamics serves as a guide. Results are as follows: (i) A simple relation between the mass and wave-function renormalizations is obtained. (ii) The theory of mixing between two vector particles cannot be applied in its simplest form if one or both of them are gauge particles. (iii) there are some restrictions on the form of the interaction with mesons, which can be tested experimentally. The analysis of the production of two vector particles from a pion incident on a nucleon is proposed as an example. (Author)

AD-629 305 Fld. 20/8, 20/10
TRINITY COLL DUBLIN (EIRE) SCHOOL OF MATHEMATICS
THE QUANTIZATION OF FIELDS WITH MAXIMUM SPIN 3/2 AND THE APPLICATION OF SU12,
by L. Castell. 22 Mar 65, 5p. Contract AF-EOAR-61-64,
AFOSR 65-2869

Unclassified report

Availability: Published in Il Nuovo Cimento v37 (s10) p1236-8 Jun 1, 1965. Copies to DDC users only.

Descriptors: (*Field theory, Quantum mechanics), (*Quantum mechanics, Field theory), Baryons, Functional analysis

AD-629 523 Fld. 20/8, 9/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J INST FOR EXPLORATORY RESEARCH
B10/B11 THERMISTOR PAIRS AND THEIR APPLICATION,
by G. K. Gaule, R. L. Ross, and J. L. Bloom. 1963, 22p.

Unclassified report

Prepared in cooperation with Martin Co., Baltimore, Md. Nuclear Div.

Availability: Published in BORON-Preparation, Properties, and Applications v2 p317-38 1965. Copies to DDC users only.

Descriptors: (*Thermistors, Boron), (*Thermal neutrons, Monitors), Isotopes, Neutron flux, Temperature, Research reactors, Measurement, Semiconductors

Pairs of thermistors were used where the two members of a pair are matched with respect to their semiconductor properties, but differ in their nuclear properties. One thermistor is made of B (11), the other of B (10). Both isotopes are stable, but, when exposed to neutrons with thermal energies, only B (10) atoms undergo nuclear reactions. The energy released causes the B (10) thermistor to become warmer than the B (11) thermistor. This temperature difference is converted into an electrical signal as usual. Experiments in a water-moderated research reactor showed that a neutron flux of 10 to the 11th power n/sq cm-sec or more gives a reproducible electrical signal in this fashion. Signals caused by other nuclear effects, such as transmutations, nuclear damage, and gamma-radiation heating, were either negligible or could be eliminated by comparing the results from a B (10) thermistor, a B (11) thermistor, and a blank. These results were .obtained with simple prototypes carrying crystalline boron layers with platinum and silver contacts on alumina plates. Preliminary experiments with B (10)/ B (11) thermistor pairs made of very high-purity boron rods and the detection of the thermal neutron part of a nuclear radiation pulse are also discussed.

AD-629 676 Fld. 20/8
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
FIELD IONIZATION OF AN ATOM NEAR A METAL SURFACE,
by D. S. Boudreaux, and P. H. Cutler. 7 Jun 65, 6p. Contract AF-AFOSR-213-63,
AFOSR 66-0229

Unclassified report

Availability: Published in Solid State Communications v3 n8 p219-21 1965. Copies to DDC users only.

Descriptors: (*Atomic energy levels, Metals), Surface properties, Ionization, Electric fields, Electrons, Wave functions, Hamiltonian

A new method is reported for calculating the field ionization of an atom near a metal surface. Instead of calculation the tunneling probability of a one-dimensional system, a variational calculation of the interaction energy of the atom with the external field is considered. The width of the ionization zone is calculated and found in reasonable agreement with known experimental data. (Author)

AD-629 703 Fld. 20/8
OXFORD UNIV (ENGLAND) DEPT OF THEORETICAL PHYSICS
EFFECTIVE INTERACTIONS IN FINITE NUCLEI,
by M. H. Hull,Jr., and C. Shakin. 1 Nov 65, 4p. Contract DA-ARO (D)-31-124-G607, Proj. DA-893-P
AROD 893:105

Unclassified report

Availability: Published in Physics Letters v19 n6 p506-9 1 Dec 1965. Copies to DDC users only.

Descriptors: (*Nuclear reactions, Potential theory), (*Nucleons, Potential theory), Oxygen, Wave functions, Nuclear shell models, Nuclear spins, Nuclear energy levels, Great Britain

A method is outlined that can provide a unified treatment, starting from realistic two-nucleon forces, of nuclear correlations, binding energies and nuclear saturation, spin-orbit splittings, and the effective interaction for the nuclear shell model.

AD-628 926 **See Fld. 5/1**

AD-628 982 **See Fld. 18/8**

AD-629 001 **See Fld. 7/4**

AD-629 014 **See Fld. 20/10**

AD-629 091 **See Fld. 20/10**

AD-629 151 **See Fld. 20/12**

AD-629 191 **See Fld. 20/3**

AD-629 378 **See Fld. 7/5**

AD-629 396 **See Fld. 7/4**

AD-629 616 **See Fld. 20/10**

AD-629 656 **See Fld. 7/4**

20/9. PLASMA PHYSICS

AD-628 890 Fld. 20/9
CFSTI Prices: HC $9.60 MF $0.75
SOCONY MOBIL OIL CO INC PRINCETON N J CENTRAL RESEARCH DIV LAB

PLASMA DENSITY BY ION BEAM PROBING; DENSITY AND SPECTROSCOPIC MEASUREMENTS OF ENERGETIC DEUTERIUM ARCS.
Scientific rept. 1 Dec 64-30 Nov 65,
by Robert L. Hickok, Forrest C. Jobes, John F. Marshalland , and Samuel L. Duncan. Jan 66, 92p. Rept. no. 1,
Contract AF 49 (638)-1500, Proj. AF-9752, Task 975201,
AFOSR 66-0285

Unclassified report

Descriptors: (*Plasma medium, Probes (Electromagnetic)), (*Ion beams, Plasma medium), (*Deuteron beams, Plasma medium), Electric arcs, Density, Measurement, Deuterium, Proton reactions, Deuteron reactions, Spectroscopy, Doppler effect, Noise, Elastic scattering

The radial density distribution in a magnetically confined, energetic deuterium arc was measured by probing the arc with a 1.8 MeV deuteron beam. Integrated densities along a beam path were determined by measuring the proton production rate from the D (d,p)H3 reaction between the deuterons in the beam and in the arc. A zone calculation was used to invert the proton production data to a radial density distribution. Peak densities on the arc axis are in the range of 10 to the 13th power to 10 to the 14th power and the radius of the half density point is in the range of 1 to 2 cm. Spectroscopic observations of the arc were also made. Comparison with estimated spectral intensities, based on the density distribution and electron temperature, indicated that for high arc currents the neutral density is determined by the recombination rate but for low arc currents there appears to be an excess of neutral atoms. Macroscopic arc parameters, such as current and voltage, have been used, together with the density distribution, in an idealized model of the arc to obtain values for the average electron temperature and plasma space potential. (Author)

AD-628 906 Fld. 20/9, 20/14
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
THE NONLINEAR INTERACTION OF A RADIOFREQUENCY WAVE WITH AN INHOMOGENEOUS PLASMA SLAB. I. KINETICS OF HIGH-TEMPERATURE AIR IN THE PRESENCE OF AN ELECTROMAGNETIC FIELD.
Physical sciences research papers,
by Robert J. Papa, and Carl T. Case. 22 Apr 65, 22p. Rept. no. AFCRL-PSRP-182 ,AFCRL-65-875-Pt-1
Proj. AF-4642, Task 464202,

Unclassified report

Availability: Published in Canadian Journal of Physics v43 p2021-35 Nov 1965. Copies to DDC users only.

Descriptors: (*Magnetohydrodynamics, High-temperature research), (*High-temperature research, Magnetohydrodynamics), (*Radio waves, Gas ionization), (*Plasma physics, Radio transmission), Gas flow, Kinetic theory, Electromagnetic fields

A radio-frequency wave is normally incident upon an inhomogeneous plasma slab. The plasma slab is composed of partially ionized high-temperature air corresponding to the characteristics of the plasma sheath surrounding hypersonic reentry vehicles. The isotropic part of the electron velocity distribution function is Maxwellian because of electron-electron collisions. The electromagnetic wave is intense enough to heat selectively the electron gas, altering the various electron production and loss processes. The high-frequency limit is considered, and expressions are obtained for the electron number density and effective collision frequency as a function of electron temperature. The effective collision frequency takes into account the effects of electron -neutral and electron-ion collisions for momentum transfer. From an energy balance equation, the electron temperature is found to be a function of both the frequency and field strength of the wave. The electron temperature is found also to exhibit an instability that gives rise to a hysteresis effect. (Author)

AD-628 910 Fld. 20/9, 20/14
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
THE NONLINEAR INTERACTION OF A RADIOFREQUENCY WAVE WITH AN INHOMOGENEOUS PLASMA SLAB. II. NONLINEAR REFLECTION AND TRANSMISSION COEFFICIENTS OF AN INHOMOGENEOUS PLASMA SLAB.
Physical sciences research papers,
by Robert J. Papa, and Carl T. Case. 22 Apr 65, 16p. Rept. no. AFCRL-PSRP-174,AFCRL-65-875-Pt-2
Proj. AF-4642, Task 464202,

Unclassified report

Availability: Published in Canadian Journal of Physics v43 p2036-44 Nov 1965. See also AD-628 906. Copies to DDC users only.

Descriptors: (*Radio waves, Gas ionization), (*Radio transmission, Plasma medium), (*Plasma physics, Radio transmission), Magnetohydrodynamics, High-temperature research, Gas flow, Electromagnetic wave reflections

AD-628 911 Fld. 20/9, 20/13
CFSTI Prices: HC $1.00 MF $0.50
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
THEORETICAL RESEARCH ON THERMODYNAMIC AND TRANSPORT PROPERTIES OF GASES AT HIGH TEMPERATURES.
Final rept.,
by H. H. Michels. Jan 66, 15p. Rept. no. UACRL-E910004-12,
Contract AF 49 (638)-1133, Proj. AF-9750 Task 975002,
AFOSR 66-0407

Unclassified report

Descriptors: (*Gases, High-temperature research), (*Thermodynamics, Gases), (*Transport properties, Gases), Mixtures, Gas ionization, Excitation, Plasma medium, Reports, Abstracts, Theory, Mathematical analysis, Perturbation theory

The research performed under this contract was directed primarily into two areas. In the first, an analysis of the problems of calculating the thermodynamic properties of a high temperature gas was undertaken in an effort to find reliable methods of extending present data to much higher temperatures. Accurate thermodynamic data are especially required for the high temperature region, perhaps to temperatures reaching 6000 Kelvin for systems deriving their energy from chemical reactions and to substantially higher temperatures for plasma systems. In the second area, an analysis was undertaken of problems associated with the prediction of transport properties in high temperature gas mixtures, especially systems with some degree of ionization or molecular excitation. A precise knowledge of the various interaction potentials between the reacting species is essential for a complete understanding of the high temperature behavior of such systems and for calculating the transport properties. (Author)

AD-628 917 Fld. 20/9
CFSTI Prices: HC $2.60 MF $0.50
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
GASDYNAMIC METHODS IN MHD FLOW.
Summary rept. no. 2, 1 Jan 63-31 Dec 65, (Final),
by Ferdinand Cap, G. Kerer, F. Herrnegger, K. Lackner, and R. Skarics. 3 Jan 66, 22p. Contract AF 61 (052)-675, Proj. AF-9752, Task 975201,
AFOSR 66-0405

Unclassified report

Descriptors: (*Magnetohydrodynamics, Mathematical analysis), (*Plasma medium, Gas flow), Two-dimensional flow, One-dimensional flow, Equations, Electrical conductance, Acceleration, Magnetohydrodynamic generators, Austria

The report contains a brief analysis of the following items: (a) Two-dimensional steady flow (variational method), (b) One-dimensional unsteady flow (variational method), (c) Plasma with finite conductivity (exact solutions), (d) Approximate solutions and linearized equations, (e) New numerical methods, (f) Low conductivity plasma, (g) Applications, (h) Plasma acceleration and MHD power generation. A detailed discussion of future plans is given. (Author)

AD-628 918 Fld. 20/9
CFSTI Prices: HC $3.00 MF $0.50
NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
MICROWAVE DIAGNOSTICS OF ARC-HEATED NITROGEN AND AIR PLASMAS.
Final rept.,
by Harold M. Waller. Aug 65, 52p. Rept. no. NU-GDL-B-2-65,
Contract AF 49 (638)-879,AF-AFOSR-329-63
Proj. AF-9752, Task 975201,
AFOSR 66-0363

Unclassified report

Descriptors: (*Plasma medium, Microwaves), (*Nitrogen, Plasma jets), (*Air, Plasma jets), Supersonic nozzles, Electron density, Attenuation, Microwave frequency, Electrical properties

Electrical properties of arc-heated nitrogen and simulated air plasma flows were studied using microwave diagnostic techniques. The plasmas were produced by running nitrogen through a commercial plasma jet with a supersonic nozzle attached downstream. Oxygen is mixed with the nitrogen plasma just upstream of the throat of the supersonic nozzle in order to produce the simulated air plasma. Electron densities and collision frequencies were determined from measurements of the phase shift and attenuation of E-band microwaves transmitted through the plasma. The microwave frequencies used were 76.9 and 82.4 kMc and for both air and nitrogen plasmas the following properties were determined: electron density, attenuation constant, and collision frequency. These properties are presented as functions of h (gas), a measure of the electrical power input to the plasma, which ranged up to 36 kilowatts. The experimental results are compared with available theoretical predictions and qualitative agreement is found. (Author)

AD-628 924 Fld. 20/9
CFSTI Prices: HC $1.10 MF $0.50
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
HYPERSONIC RAREFIED PLASMA FLOW.
Final progress rept.,
by Sinclaire M. Scala. Nov 65, 9p. Rept. no. 214-W53,
Contract AF 49 (638)-1283, Proj. AF-9783, Task 978302,
AFOSR 66-0365

Unclassified report

Descriptors: (*Plasma medium, Hypersonic flow), (*Superaerodynamics, Plasma medium), Continuum mechanics, Equations, Hydrodynamics

The report deals with research in hypersonic rarefied gas dynamics. For a single component gas techniques for a hypersonic approximation to the moment equations were considered and a paper written on their application to the problem of source flow expansion. For gas mixtures a multifluid hydrodynamic theory was developed for a disparate mass mixture. In addition, work on the numerical solution of the non-linear Boltzmann equation was continued. (Author)

AD-628 930 Fld. 20/9
CFSTI Prices: HC $1.60 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
RESEARCH ON ROTATING RF FIELD PLASMA.
Final rept. 1 Oct 64-30 Sep 65,
by M. L. Pool. Jan 66, 15p. Rept. no. 1,
Contract AF-AFOSR-202-65, Proj. AF-9752,RF-1906 Task 975201,
AFOSR 66-0408

Unclassified report

Descriptors: (*Plasma medium, Production), (*Hydrogen, Plasma medium), Plasma generators, Cyclotrons, Magnetic materials, Lasers, Interferometers, Rotation, Electric fields, Ferrites

Two-phase, ion-cyclotron frequency power put to a magnetic bottle has produced a hydrogen plasma over a wide range of pressures. Electrons and ions which escape from the ends of the bottle have maximum energies in the neighborhood of 12 keV, as indicated by multi-diffused junction detector with a depletion depth of 0-100 microns. A 30-joule diagnostic laser was used for measuring electron densities in the region of 10 to the 13 power per cc. A Fabry-Perot interferometer, with an interference filter for the H alpha 6563 A hydrogen line, was assembled for photographing the Haidinger rings. From the line-broadening measurements an energy of 18 eV was estimated for the neutral hydrogen atoms in the plasma. Ferrite cores were tested at 4.0 megacycles in a 5000-gauss B sub z magnetic field. The results encouraged the design of an ensemble of two eight-group, two-phase coils. This ensemble is being fabricated for the purpose of creating stronger revolving magnetic and rotating electric fields. (Author)

AD-628 968 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
DIFFUSION OF A FULLY IONIZED PLASMA ACROSS A MAGNETIC FIELD.
Research translation,
by V. F. Aleksin, and N. A. Khizhniak. Dec 65,
9p. Rept. no. T-R-467,
Contract AF 19 (628)-3880,
TT 66-60674

Unclassified report

O Diffuzii Polnostiu Ionizovannoi Plazmy Poperek Magnitnogo Polia, trans. of Konferentsiya po Fizike Plazmy i Probleme Upravliaemykh Termoiadernykh Reaktsii, Doklady, Kharkov, (3rd), Apr 1962. Kiev, Izd-vo Akad. Nauk Ukrainskoi SSR, 1963 p332-6.

Descriptors: (*Diffusion, Magnetohydrodynamics), (*Magnetohydrodynamics, Diffusion), Plasma physics, USSR

In studying the diffusion of charged particles in a weakly ionized plasma, the motion of the charged component of plasma relative to a neutral-particle gas is usually examined. In this case, the coefficient of diffusion is practically independent of the charged-particle density and the diffusion process is described by the ordinary linear equation of diffusion.

AD-629 120 Fld. 20/9, 21/8
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
EFFECTS OF ROCKET OUTGASSING ON RF EXPERIMENTS.
Environmental research papers,
by W. Pfister, and J. C. Ulwick. 9 Feb 65, 16p.
Rept. no. AFCRL-ERP-148 ,AFCRL-65-751
Proj. AF-7663, Task 766301,

Unclassified report

Availability: Published in Radio Science Journal of Research NBS/USNC-URSI v69D n9 p1219-25 Sep 1965. Copies to DDC users only.

Descriptors: (*Ionization trails, Rocket propulsion), (*Rockets, Ionization trails), Exhaust gases, Gas ionization, Probes (Electromagnetic), Electron density

Peculiarities in the results of electron-density measurements with rockets were noticed on several occasions. They were found to be effects of rocket outgassing. When the fuel valves of Aerobee rockets are not shut after burnout, residual fuel leaks out and diffuses into the atmosphere. Electrons attach to the fuel and decrease in concentration while the positive ions are not affected. Outgassing effects were observed on probe experiments flown in rockets as well as on propagation experiments between rocket and ground. Quantitative estimates indicate that the leaking fuel is a very effective attaching agent. Some solid-fuel rockets also show similar effects. (Author)

AD-629 260 Fld. 20/9
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF SPACE SCIENCE LAB
MAGNETIC FIELD DIFFUSION ASSOCIATED WITH AN IONIZING SHOCK WAVE INTERACTING WITH AN ELECTROMAGNETIC FIELD.
Revised ed.,
by Jan Rosciszewski, and Arnold Kritz. 20 May 64, 2p. Contract AF 49 (638)-1357,
AFOSR 65-2487

Unclassified report

Revision of manuscript submitted 2 Apr 1964.

Availability: Published in The Physics of Fluids v7 n8 p1393-4 Aug 1964. Copies to DDC users only.

Descriptors: (*Magnetohydrodynamics, Shock waves), (*Shock waves, Electromagnetic fields), (*Magnetic fields, Diffusion), Gas ionization, Linear systems, Electrical conductance, Mathematical analysis

The diffusion of the magnetic field is calculated assuming linearized flow behind the shock wave of arbitrary strength.

AD-629 262 Fld. 20/9, 20/13
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
THERMODYNAMICS OF A MHD-PLASMA WITH INFINITE ELECTRICAL CONDUCTIVITY,
by F. Cap. 3 Sep 64, 8p. Contract AF 61 (052)-675,
AFOSR 65-2250

Unclassified report

Availability: Published in Acta Physica Austriaca, v19 p333-8 1965. Copies to DDC users only.

Descriptors: (*Thermodynamics, Plasma physics), (*Plasma physics, Thermodynamics), (*Magnetohydrodynamics, Plasma physics), Equations of motion, Austria

AD-629 349 Fld. 20/9
CFSTI Prices: HC $2.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
HIGH-FREQUENCY OSCILLATIONS RESULTING FROM THE INTERACTION OF AN ELECTRON BEAM WITH PLASMA,
by A. K. Berezin, Ya. B. Fainberg, G. P. Berezina, and L. T. Bolotin. 20 Jan 66, 24p. Rept. no. FTD-TT-65-1455,
TT 66-60700

Unclassified report

Unedited rough draft trans. of Atomnaya Energiya (USSR) v18 n1 p5-14 1965.

Descriptors: (*Plasma oscillations, High frequency), (*Electron beams, Oscillation), Magnetic fields, Velocity, Cyclotrons, USSR

Results are given of experiments on the detection and study of oscillations developed in a beam and plasma produced as the result of their interaction. The experiments were conducted under conditions where the electron Langmuir frequency of the plasma, was less than the electron cyclotron frequency. The conditions of wave excitation in the beam and plasma, their frequency spectra, phase velocities, amplification factors, electrical field intensity, and absolute values and spectral distribution of excited oscillation power are determined. Experimental results from measurement of frequencies, amplification factors and phase velocities of excited oscillations in the plasma are in satisfactory agreement with calculated data. (Author)

AD-629 358 Fld. 20/9
MARYLAND UNIV COLLEGE PARK
EXPERIMENTAL STUDY OF SHOCK WAVE FORMATION IN AN ALMOST COLLISION FREE PLASMA,
by G. Goldenbaum, and E. Hintz. 1965, 2p.

Unclassified report

Availability: Published in The Physics of Fluids v8 n11 Nov 1965. Copies to DDC users only.

Descriptors: (*Shock waves, Plasma physics), (*Plasma physics, Shock waves), Experimental data, Hydrogen, Electron density, Magnetohydrodynamics

AD-629 417 Fld. 20/9, 20/4
CORNELL UNIV ITHACA N Y
THE HYDROMAGNETICS OF AN ELLIPSOID MOVING IN AN ALIGNED FIELD,
by G. S. S. Ludford, and M. P. Singh. 19 Jun 65, 4p. Contract DA-31-124-ARO (D)-325,
AROD 5329:1

Unclassified report

Availability: Published in Proc. Camb. Phil. Soc. v62 p95-8 1966. Copies to DDC users only.

Descriptors: (*Magnetohydrodynamics, Ellipsoids), (*Bodies of revolution, Magnetohydrodynamics), Boundary value problems

AD-629 496 Fld. 20/9
CFSTI Prices: HC $2.60 MF $0.50
STANFORD UNIV CALIF INST FOR PLASMA RESEARCH
STUDY OF TRANSIENT PHENOMENA IN LOW PRESSURE GAS DISCHARGE PLASMAS.
Quarterly rept. no. 7, 3 Aug-3 Nov 65,
by Heinrich Derfler. Dec 65, 21p. Contract AF 33 (615)-1504, Proj. AF-7073,
ARL 65-276

Unclassified report

Descriptors: (*Electric fields, Plasma medium), (*Plasma medium, Gas discharges), Excitation, Noise, Propagation, Damping, Plasma oscillations, Low-pressure research

The electric field excited in a Maxwellian electron plasma by a pair of closely spaced grids was calculated by three methods, numerical evaluation of the cosine integral expression, summation of the plasma wave functions and the Bohm and Gross wave approach. It is shown that the higher order modes, although damped, are excited sufficiently to be important and account for any difference between the first two methods. (Author)

AD-629 535 Fld. 20/9
CALIFORNIA INST OF TECH PASADENA
ECHO PHENOMENA.
Technical rept.,
by Roy W. Gould. Dec 65, 6p. Rept. no. TR-29,
Contract Nonr-220 (50)

Unclassified report

Availability: Published in Physics Letters v19 n8 p477-8 1 Dec 1965. Copies to DDC users only.

Descriptors: (*Plasma oscillations, Cyclotron resonance phenomena), (*Cyclotron resonance phenomena, Plasma oscillations), Plasma physics

Due to small nonlinearities, an ensemble of oscillators may exhibit echoes when subjected to multiple pulses of radiation near their resonant frequency. Cyclotron echoes from gyrating charged particles is discussed as an example. (Author)

AD-629 537 Fld. 20/9, 9/1, 9/5
CFSTI Prices: HC $3.00 MF $0.75
MICROWAVE ASSOCIATES INC BURLINGTON MASS
INVESTIGATION OF HIGH POWER GASEOUS ELECTRONICS.
Rept. no. 12 (Final progress rept.), 16 Nov 6215 Nov 65,
by H. S. Maddix. Feb 66, 62p. Contract DA-36-039-AMC-00097 (E), Proj. DA-1G6-22001-A-055-04,

Unclassified report

See also-AD-622 683.

Descriptors: (*Gas discharges, Microwave equipment), (*Sorption, Gas discharges), (*Duplexers (Electronic), Gas discharges), (*Microwave equipment, Duplexers (Electronics)), Electronic switches, Argon, Ammonia, Water vapor, Relaxation time

An experimental technique is described for obtaining reproducible clean-up measurements in high power microwave duplexer discharges under controlled conditions. A basic clean-up rate is defined as the number of molecules sorbed per cc of discharge area per square root of average incident power. Data is given for the clean-up of inert gases in quartz; hydrogen in 7070 glass, quartz, copper, nickel, molybdenum and kovar; and oxygen and bromine in kovar. A technique is outlined for predicting duplexer life time when limited by diffusion controlled clean-up. Life time increases with the square of the gas-volumeto-discharge-area ratio and with the square of the pressure range over which a tube remains operable. Life time is also inversely proportional to peak power and to the square of duty cycle. (Author)

AD-628 893 **See Fld. 4/1**

AD-628 926 **See Fld. 5/1**

AD-628 941 **See Fld. 20/5**

AD-628 946 **See Fld. 5/1**

AD-629 336 **See Fld. 4/1**

AD-629 337 **See Fld. 4/1**

AD-629 685 **See Fld. 12/1**

20/10. QUANTUM THEORY

AD-628 885 Fld. 20/10, 8/5
CFSTI Prices: HC $14.70 MF $1.00
KING'S COLL UNIV OF LONDON (ENGLAND)
INTERNATIONAL CONFERENCE ON RELATIVISTIC THEORIES OF GRAVITATION, LONDON, 1965, VOLUME II.
Final scientific rept.
1965, 151p. Contract AF-EOAR-21-65, Proj. AF-7114,
ARL 66-0033-Vol-2

Unclassified report

Descriptors: (*Gravity, Relativity theory), (*Relativity theory, Gravity), (*Quantum mechanics, Gravity), Partial differential equations, Center of mass, Astrophysics, Wave functions, Field theory, Symposia, England, Equations of motion

AD-628 922 Fld. 20/10, 7/4
CFSTI Prices: HC $1.10 MF $0.50
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS
ELECTRONIC STRUCTURE AND ENERGY LEVELS OF MANY ELECTRON ATOMS.
Final scientific rept.,
by John Midtdal. 25 Jan 66, 8p. Contract AF-EOAR-32-64, Proj. AF-9760 Task 976001, AFOSR 66-0362

Unclassified report

Descriptors: (*Atomic structure, Quantum mechanics), (*Atomic energy levels, Quantum mechanics), (*Atomic orbitals, Quantum mechanics), (*Quantum mechanics, Atomic properties), Electrons, Perturbation theory, Wave functions, Rotation, Energy, Nuclear spins, Particles, Scattering, Norway

The document is comprised of abstracts of results (published elsewhere) of work in the following areas: theoretical and numerical investigations of two-electron atoms and ions, with perturbation theory expansions of their energies and wave functions; theoretical investigations of the rotational energy of the asymmetrical top; quantum particle dynamics and scattering problems in quantum mechanics. (Author)

AD-628 969 Fld. 20/10
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SIX-J COEFFICIENTS WITH NEGATIVE PARAMETERS.
Research translation,
by A. V. Karosene, A. Iu. Savukinas, A. A. Bandzaitis, Ia. I. Vizbaraite, and A. P. Iutsis. Dec 65, 16p. Rept. no. t-R-464,
Contract AF 19 (628)-3880,
TT 66-60675

Unclassified report

6j-Koeffitsienty s Otritsatelnymi Parametrami, trans. of Lietuvos Fizikos Rinkinys (Lithuanian) v4 n2 p187-96 1964.

Descriptors: (*Quantum mechanics, Momentum), (*Momentum, Quantum mechanics), Mathematical analysis, USSR

Five different possible forms of the formulas for the 6j coefficients are presented both in the form of unitary sums of expressions composed of factorials of linear combinations of parameters and in the form of quasi-binomials. These formulas are used to obtain the phase relations between 6j coefficients with negative parameters and the corresponding normal coefficients. The practical application of the proposed mathematics is illustrated through examples. (Author)

AD-629 014 Fld. 20/10, 20/8, 20/12, 6/18
CFSTI Prices: HC $3.00 MF $0.75
ASPEN INST FOR HUMANISTIC STUDIES COLO
REPORT TO THE OFFICE OF NAVAL RESEARCH.
Final rept.,
by George Stranahan. 8 Dec 65, 62p. Contract Nonr (G)-00072-65,

Unclassified report

Final report of Research Conference on Theoretical Physics, 7 Jun-3 Sep 65.

Descriptors: (*Physics, Symposia), (*Quantum mechanics, Symposia), (*Field theory, Symposia), Abstracts, Phase studies, Superfluidity, Solid state physics, Elementary particles, Radiobiology

The Physics Division of the Aspen Institute for Humanistic Studies Report for Summer 1965 is composed of a statement of its activities, with attached appendices covering individual reports of the research conferences on theoretical physics, together with briefs on resulting papers. Sixty-six physicists, representing a variety of specialties and institutions, give reports of their work completed in the six-week summer program and also the results of cross-fertilization of ideas, not only among their colleagues but also in exchange meetings with participants of other programs of the Aspen Institute. Seminars covered were: Survey and Classification of Soluble Models in Field Theory; Exact Eigenstates of the Pairing Hamiltonian; Phase Transitions in Some Interacting Fermi Systems; Regge Representations of the Scattering Amplitude; Phonons in Liquids; Particles and Particle Collisions in Quantum Field Theory; The Superfluid Fermi-Liquid; Interaction of Lambda Beta Decay; Rotationally Symmetric Model Field Theories; The Effects of Radiation on Mammals. (Author)

AD-629 041 Fld. 20/10
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
HIGH-ORDER LIMIT OF PARA-BOSE AND PARAFERMI FIELDS,
by O. W. Greenberg, and A. M. L. Messiah. 26 Aug 64, 6p. Contract AF-AFOSR-500-64,NSF-GP-3221 Proj. AF-9751, Task 975101, AFOSR 65-2140

Unclassified report

Prepared in cooperation with Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.

Availability: Published in Journal of Mathematical Physics v6 n4 p500-4 Apr 1965. Copies to DDC users only.

Descriptors: (*Quantum mechanics, Field theory), (*Field theory, Quantum mechanics), Bosons, Fermions, Quantum statistics

Para-Bose and para-Fermi quantization are schemes of second quantization which generalize the usual Bose and Fermi schemes. The different cases of para-Bose (para-Fermi) quantization are labeled by a positive integer p, which is called the 'order.' For p = 1, the usual Bose (Fermi) quantization is recovered. The high-p limit of para-Bose (para-Fermi) quantization is studied, and it is shown that, to a large extent, the high-p limit of a para-Bose (para-Fermi) field is a Fermi (Bose) field. The nature of the limit is studied in detail, and a paradox relating of the connection of spin and statistics is resolved. (Author)

AD-629 091 Fld. 20/10, 20/8, 7/4
CFSTI Prices: HC $1.60 MF $0.50
UPPSALA UNIV (SWEDEN) QUANTUM CHEMISTRY GROUP
THE GROUND-STATE THREE-BODY CORRELATION FUNCTION IN A DILUTE BOSON GAS WITH HARD-SPHERE INTERACTION.
Scientific rept.,
by Vedene H. Smith,Jr.. 15 Apr 65, 11p. Rept. no. Scientific-41,
Contract AF 61 (052)-701, Proj. AF-7112 Task 61445014,681302
ARL 66-0034

Unclassified report

Preprint no. 147.

Descriptors: (*Bosons, Nuclear energy levels), (*Statistical functions, Bosons), Wave functions, Approximation (Mathematics), Excitation, Nuclear reactions, Sweden

The three-body correlation function for the ground state of a boson gas with hard sphere interactions is evaluated in the approximation of pair excitations. The evaluation is made using both the formalism of second quantization and the cluster expansion method in configuration space. The result is compared with a previous calculation using the same wave function. The behaviour of the correlation function is discussed. (Author)

AD-629 097 Fld. 20/10, 8/5
CFSTI Prices: HC $6.60 MF $0.75
KING'S COLL UNIV OF LONDON (ENGLAND)
INTERNATIONAL CONFERENCE ON RELATIVISTIC THEORIES OF GRAVITATION, LONDON, 1965, VOLUME I.
Final scientific rept.,
by H. Bondi. Jul 65, 69p. Contract AF-EOAR-21-65, Proj. AF-7114,
ARL 66-0032

Unclassified report

Descriptors: (*Relativity theory, Gravity), (*Gravity, Relativity theory), Geophysics, Astrophysics, Quantum mechanics, Symposia, England

About 300 delegates from all parts of the world met from the 1st to the 10th July in London at Imperial College for the 5th International Conference on relativity. Most interesting discussions on the question of gravitational collapse were held. Considerably more is now known about bodies collapsing under their own gravitational stresses than a year ago. The equations of collapse have been integrated numerically, notably by Michael May, and it is found that certain kinds of matter can, instead of undergoing a catastrophic collapse, 'bounce'. The final state becomes one of ultimate dispersion. Whether such behaviour can occur in practice is still in doubt. The great interest in collapsing bodies has been caused by the discovery of quasars, and it seemed for a considerable time that the collapsing bodies and the quasars were identical. The large amounts of energy radiated by quasers may well require a source of energy liberating a larger fraction of the mass than nuclear reaction can do, and the only such possibility seems to be gravitational contraction and collapse. However the rapidly collapsing body suffers from two great defects when providing so much energy. The matter is moving inwards at a high speed, producing an extreme Doppler shift to the red and the extreme concentration produces a strong gravitational field and so a further shift to the red, due to the usual general relativistic effect. (Author)

AD-629 141 Fld. 20/10, 20/3
CFSTI Prices: HC $2.60 MF $0.50
PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSICS
WICK AND GOLDSTONE THEOREMS FOR GENERAL SPIN; ANTIFERROMAGNETIC SPIN WAVES II.
Technical rept.,
by Yung-Li Wang, and H. B. Callen. Jan 66, 30p.
Rept. no. TR-29,
Contract Nonr-551 (36),

Unclassified report

Descriptors: (*Nuclear spins, Equations), (*Perturbation theory, Operators (Mathematics)), (*Antigerromagnetism, Nuclear spins), Field theory, Bosons, Quantum mechanics, Statistical mechanics

The analogues of Wick's theorem and of Goldstone's theorem, proved in the preceding paper (AD-624 720) for spin 1/2, are generalized to arbitrary spin. The proof is based on the Schwinger coupled-boson representation of spin operators. Quantum corrections to the spin wave modes in antiferromagnets are again considered, and it is shown that these corrections can be expanded in powers of 1/2Sz, where z is the number of nearest neighbors. For large S the 1/S factor presumably provides convergence, as assumed by Oguchi, whereas for S = 1/2 the expansion parameter reduces to 1/z, as discussed in the preceding paper. (Author)

AD-629 398 Fld. 20/10, 7/4
CALIFORNIA UNIV SAN DIEGO DEPT OF CHEMISTRY
ON A SECOND-ORDER THOMAS-FERMI THEORY,
by George S. Handler. 13 Apr 65, 3p. Contract DA-31-124-ARO (D)-257,
AROD 5133:3

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n10 pS253-5 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Atomic structure, Theory), (*Quantum mechanics, Harmonic generators), Operators (Mathematics), Matrix algebra, Hamiltonian

A second-order Thomas-Fermi theory, involving a product representation of the theta operator, has been constructed. It yields a particle density exhibiting a shell structure for the one-dimensional harmonic oscillator. (Author)

AD-629 540 Fld. 20/10
ARKANSAS UNIV FAYETTEVILLE DEPT OF PHYSICS
RADIATIVE LIFETIMES AND EXCITATION MECHANISMS IN HELIUM,
by W. R. Pendleton Jr., and R. H. Hughes. 7 Dec 64, 5p. Contract AF-AFOSR-62-159,
AFOSR 65-2776

Unclassified report

Availability: Published in The Physical Review v138 n3A pA683-7 May 3 1965. Copies to DDC users only.

Descriptors: (*Helium, Quantum mechanics), (*Quantum mechanics, Helium), Excitation, Electron transitions, Atomic energy levels, Relaxation time, Lasers

AD-629 541 Fld. 20/10, 20/6
ARKANSAS UNIV FAYETTEVILLE DEPT OF PHYSICS
DEPENDENCE ON MAGNETIC FIELD OF POLARIZATION OF RADIATION FROM ELECTRON-HELIUM COLLISION,
by R. H. Hughes, and L. D. Weaver. 25 Aug 64, 1p. Contract AF-AFOSR-62-159,
AFOSR 65-2775

Unclassified report

Availability: Published in Journal of the Optical Society of America v54 n12 p1493-4 Dec 1964. Copies to DDC users only.

Descriptors: (*Helium, Quantum mechanics), Excitation, Electrons, Electromagnetic waves, Polarization, Magnetic fields, Optics

AD-629 616 Fld. 20/10, 20/13, 20/8
CATHOLIC UNIV OF AMERICA WASHINGTON D C
STATISTICAL MECHANICS OF AN ASSEMBLY OF QUASIPARTICLES,
by Tohru Morita, and Tomoyasu Tanaka. .1 Oct 64, 12p. Contract AF-AFOSR-445-63,
AFOSR 65-2780

Unclassified report

Availability: Published in The Physical Review v138 n4A pA1088-96 May 17 1965. Copies to DDC users only.

Descriptors: (*Cryogenics, Statistical mechanics), (*Statistical mechanics, Cryogenics), (*Fermions, Statistical mechanics), (*Bosons, Statistical mechanics), Distribution functions, Entropy, Equations of state

Low-lying excitations in a liquid or a solid are considered to have a long lifetime and to obey the Bose or Fermi statistics. They will be called 'quasiparticles' in general. The low-lying energy levels of the system are considered to be characterized by a set of occupation numbers of the quasiparticles. The expressions for the grand partition function and the distribution function (the average occupation number) of the quasiparticles have the same structure as that for the classical lattice gas, under a nonuniform external field and with two-, three-, ..., body interactions. Therefore the virial expansion formula for the classical lattice gas can be applied to the system of quasiparticles. The resulting expression for the distribution function of the quasiparticles is either a Fermi or a Bose distribution function with an effective energy. The expression for the entropy in terms of the distribution function is the same as that for an ideal gas. This shows that Landau's formula for the distribution function of quasiparticles for a Fermi liquid is valid under conditions which are more general and more practical than those given by Landau. Finally the situation in the Husimi-Temperley model is discussed in comparison with that in the Ising model from the point of view of the present formulation. (Author)

AD-629 655 Fld. 20/10
PITTSBURGH UNIV PA DEPT OF PHYSICS
ELECTRICAL AND THERMAL RESISTIVITIES OF THE NON-MAGNETIC TRANSITION METALS WITH A TWO-BAND MODEL,
by Leroy Colquitt Jr.. 21 Dec 64, 7p. Contract AF-AFOSR-196-63, Proj. AF-9761 Task 976101,
AFOSR 65-2101

Unclassified report

Availability: PUBLISHED IN Journal of Applied Physics v36 n8 p2454-8 Aug 1965. Copies to DDC users only.

Descriptors: (*Transition elements, Band theory of solids), Resistance (Electrical), Thermal conductivity, Electron transitions, Electrons, Scattering, Transport properties

A two-band spherical model is used to represent the conduction electrons of the nonmagnetic transition metals with an incomplete d shell. It is shown by comparison with experimental results that phonon-induced interband s-d transitions are the major contributor to the electrical and thermal resistivities rho and W at all but the lowest temperatures. Consequently, the momentum gap between the s and d bands is an important parameter of the theory and may be used to classify the behavior of rho and W. At the lowest temperatures it is found that the experimental data for rho of all the transition metals studied may be consistently interpreted if it is assumed that electron-electron scattering processes are important. (Author)

AD-628 929 See Fld. 9/4

AD-629 022 See Fld. 7/4

AD-629 023 See Fld. 12/1

AD-629 024 See Fld. 7/4

AD-629 176 See Fld. 12/1

AD-629 182 See Fld. 20/3

AD-629 305 See Fld. 20/8

AD-629 324 See Fld. 7/4

AD-629 690 See Fld. 20/4

20/11. SOLID MECHANICS

AD-628 925 Fld. 20/11
CFSTI Prices: HC $5.60 MF $0.50
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
QUELQUES NOUVEAUX RESULTATS DE RECHERCHES SUR LE FLAMBAGE DES COQUES CYLINDRIQUES (SOME NEW RESULTS FROM RESEARCH ON THE BUCKLING OF CYLINDRICAL SHELLS),
by Nicholas J. Hoff. May 65, 52p. Rept. no. SUDAER-240,
Contract AF 49 (638)-1276,
AFOSR 66-0085

Unclassified report

Descriptors: (*Structural shells, Buckling (Mechanics)), (*Cylindrical bodies, Buckling (Mechanics)), France, Mathematical analysis, Deformation

AD-629 040 Fld. 20/11
TECHNION - ISRAEL INST OF TECH HAIFA
BUCKLING OF CIRCULAR CONICAL SHELLS UNDER UNIFORM AXIAL COMPRESSION,
by Josef Singer. 7 Dec 64, 4p. Contract AF-EOAR-58-63, Proj. AF-9782, Task 978201, AFOSR 65-2168

Unclassified report

Availability: Published in AIAA Journal, v3 n5 p985-7 May 1965. Copies to DDC users only.

Descriptors: (*Buckling (Mechanics), Structural shells), (*Structural shells, Buckling (Mechanics)), Conical bodies, Loading (Mechanics), Israel

AD-629 179 Fld. 20/11, 7/4
CFSTI Prices: HC $2.00 MF $0.50
OKLAHOMA STATE UNIV STILLWATER RESEARCH FOUNDATION
SHEAR WAVE PROPAGATION IN BIREFRINGENT VISCOELASTIC LIQUIDS OF LOW RIGIDITY AND LOW VISCOSITY.
Technical rept.,
by G. B. Thurston. Mar 66, 34p. Contract Nonr-2595 (03), Proj. NR-385-545,

Unclassified report

Prepared for presentation at the Rheology Conference, Syracuse University Pinebrook Conference Center, August 23-27, 1965, Pinebrook, New York.

Descriptors: (*Mechanical waves, Propagation), (*Shear stresses, Liquids), Viscoelasticity, Aluminum compounds, Oxides, Water, Polyethylene plastics, Optical analysis

Utilizing the optical birefringence induced by shearing deformation of viscoelastic liquids it is possible to carry out direct quantitative measurements of the progression of a shear wave in the liquid. From measurements of the amplitude and phase of the optical effect versus propagation distance, values of the attenuation and phase constants of the medium are obtained. From these, a complex coefficient of viscosity is determined. An improved optical detection scheme permits measurements as near to the shear wave source as 100 microns with a field resolution of approximately 10 microns. It is thus possible to carry out measurements for liquids of viscosity near that of water and having very low rigidity. A theoretical model for a dilute suspension of rigid macromolecules of ellipsoidal shape is described and measured values are compared with the theory. This is done for an aqueous suspension of colloidal alumina, Dupont 'Baymal', with good general agreement as to frequency and temperature dependence of the propagation characteristics. Measured values are also presented for a polyethylene oxide polymer in combination with Baymal in water. (Author)

AD-629 372 Fld. 20/11, 11/4
CFSTI Prices: HC $6.60 MF $0.75
WAYNE STATE UNIV DETROIT MICH COLL OF ENGINEERING
DIGITAL COMPUTER METHODS IN THE SOLUTION OF BOUNDARY VALUE PROBLEMS FOR THE NATURAL FREQUENCIES OF LAMINATED, ELASTIC, VISCOELASTIC BEAMS HAVING UNSYMETRICAL MOUNTINGS,
by Milton G. Koenig. 5 May 65, 63p. Contract N61533-823-65; Proj. S-F013-11-08, Task 1353, MEL 252/65

Unclassified report

Descriptors: (*Beams (Structural), Frequency), (*Boundary value problems, Beams (Structural)), (*Composite materials, Beams (Structural)), Laminates, Viscoelasticity, Sandwich construction, Damping, Supports, Digital computers, Programming (Computers)

An analytical study was performed to determine methods of solution for boundary value problems dealing with the natural frequencies and the system loss factor of composite beams having different types of attachment at each end. The composite beam is a laminate composed of a thin layer of a viscoelastic material which is sandwiched between two layers of an elastic material. Damping is provided by the visco-elastic shearing. The material shear modulus is assumed to be a complex number. The results of this study is a method for determining the matrix polynomials which provide multi-valued solutions. In addition a Fortran program was developed in order to determine the natural frequencies and system loss factors for cases where the beam is mounted with a fixed simple support or with a cantilever support. The program was not successful in handling the damped cases and only partially successful for the undamped cases. (Author)

AD-629 373 Fld. 20/11
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
ANALYSE MATHEMATIQUE. EVALUATION PAR DEFAUT DE TOUTES LES FREQUENCES PROPRES D'UNE MEMBRANE A L'AIDE DE COUPURES CHARGEES (SOLUTION BY PERTURBATION OF ALL THE MAIN FREQUENCIES OF A MEMBRANE BY THE METHOD OF LOADED SECTIONS),
by M. Joseph Hersch. 1962, 4p. Contract AF 49 (638)-253,
AFOSR J-23

Unclassified report

Text in French. Attached summary in English.

Availability: Published in Comptes Rendus des Beances de l'Academie des Sciences v225 p1286-8 27 Oct 1962. Copies to DDC users only.

Descriptors: (*Perturbation theory, Membranes), (*Membranes, Loading (Mechanics)), Vibration

AD-629 428 Fld. 20/11
CFSTI Prices: HC $2.60 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD EXPLOSION DYNAMICS DIV
THE EXISTENCE AND IMPLICATIONS OF CURVATURE IN THE RELATION BETWEEN SHOCK AND PARTICLE VELOCITIES FOR METALS,
by D. John Pastine, and D. Piacesi. 4 Feb 66, 27p. Task R360-FR105/R011-01-01, NOLTR 65-233

Unclassified report

Descriptors: (*Metals, Impact shock), (*Shock waves, Metals), Velocity, Equations of state, Compressive properties, Particles, Pressure, Ultrasonic radiation, Equations, Volume

Evidence is presented for the existence of curvature in the relation between shock velocity (U) and particle velocity (u) for metals. Existing U,u data is fit to an expansion of the form U = Cb + b1u + b2/2 (u sq.) where Cb is the bulk sound speed at zero pressure. The slopes b1 thus calculated are shown to agree well with the slopes (b1) predicted on the basis of low pressure ultrasonic data. In addition, possibility of estimating the U,u relation from low pressure data is demonstrated. (Author)

AD-629 436 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.75
WESTINGHOUSE ATOMIC POWER DIV PITTSBURGH PA
FRACTURE MECHANICS: A BASIS FOR BRITTLE FRACTURE PREVENTION,
by R. E. Johnson. Nov 65, 91p. Rept. no. wapd-TM-505,
Contract NObs-90029,

Unclassified report

Descriptors: (*Fracture (Mechanics), Brittleness), Toughness, Transition temperature, Measurement, Strain (Mechanics), Defects (Materials), Failure (Mechanics), Mathematical prediction, Temperature, Stresses, Theory

The development of fracture mechanics is presented both historically and mathematically. The central problems and limitations of experimental fracture mechanics are detailed along with the assumptions and approximations used. The meaning, measurement, and utility of plane strain fracture toughness (critical strain energy release rate or critical stress intensity factor) are discussed. The role of defects in components is discussed specifically with respect to the relationships between stress fields, defect geometry, and material condition. Basic aspects of ultrasonic testing are discussed with respect to quantitative measurement of defect geometries in structures. Selected experiments dealing with application of fracture mechanics to predict actual component failures are reviewed. It is shown that the relationships between stress state, defect geometry, elastic constants, and fracture toughness employed in applied fracture mechanics can be utilized to predict brittle failure conditions in a more quantitative manner than transition temperature concepts. (Author)

AD-629 440 Fld. 20/11
CFSTI Prices: HC $23.60 MF $1.25
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INTRODUCTION TO THE TECHNICAL THEORY OF STABILITY OF MOTION,
by K. A. Karacharov, and A. G. Pilyutik. 29 Dec 65, 240p. Rept. no. FTD-MT-64-449, TT 66-60727

Unclassified report

Edited machine trans. of mono. Vvedenie v Tekhnicheskuyu Teoriyu Ustoichivosti Dvizheniya, Moscow, 1962 p1-243.

Descriptors: (*Motion, Stability), (*Stability, Mathematical analysis), Polynomials, Differential equations, USSR, Integrals, Theory, Perturbation theory

Criteria of stability are established with the help of the differential method both with and without using values of roots of characteristic equation.

AD-629 568 Fld. 20/11, 17/7
MINNESOTA UNIV MINNEAPOLIS DEPT OF AERONAUTICS AND ENGINEERING MECHANICS
NONLINEAR OSCILLATIONS OF A GYROSCOPIC PENDULUM WITH AN OSCILLATING POINT OF SUSPENSION,
by P. R. Sethna, and Gene W. Hemp. 1964, 19p. Contract AF-AFOSR-62-275,
AFOSR 65-2342

Unclassified report

Availability: Published in Centre National de la Recherche Scientifique Colloques Internationaux n148 p375-91. Copies to DDC users only.

Descriptors: (*Oscillation, Suspension devices), (*Suspension devices, Oscillation), Gyroscopes, Vibration, Nonlinear systems, Equations of motion

On etudie le mouvement d'um pendule gyroscopique dont le point de suspension vibre le long de sa verticale, avec une frequence quelconque; aucune hypothese restrictive n'est faite sur la vitesse de rotation du gyroscope. On discute la stabilite des mouvements non-lineaires resonants au voisinage de mouvements de precession etablis, ainsi que l'effet asymptotique d'oscillations a haute frequence de point de suspension. (Author)

AD-629 579 Fld. 20/11
CFSTI Prices: HC $3.60 MF $0.50
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
A NEW SOLUTION OF THE BUCKLING PROBLEM OF THIN CIRCULAR CYLINDRICAL SHELLS HEATED ALONG AN AXIAL STRIP.
Scientific rept.,
by Nicholas J. Hoff, and Bernard Ross. May 65, 34p. Rept. no. SUDAER-234,
Contract AF 49 (638)-1276, Proj. AF-9782, Task 978201,
AFOSR 66-0005

Unclassified report

Descriptors: (*Structural shells, Buckling (Mechanics)), (*Cylindrical bodies, Buckling (Mechanics)), Heating, Functions, Stresses, Thermal stresses, Mathematical analysis

With the aid of a set of orthonormal functions the critical temperatures are calculated for thin-walled circular cylindrical shells rapidly heated along a narrow axial strip. The results obtained are compared with experimental data of an earlier investigation. (Author)

AD-629 580 Fld. 20/11
CFSTI Prices: HC $3.60 MF $0.50
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
AN ANALOG STUDY OF THE THERMAL BUCKLING BEHAVIOR OF THIN CYLINDRICAL SHELLS.
Scientific rept.,
by Bernard Ross. Apr 65, 38p. Rept. no. SUDAER-226,
Contract AF 49 (638)-1276, Proj. AF-9782, Task 978201,
AFOSR 65-1875

Unclassified report

Descriptors: (*Structural shells, Buckling (Mechanics)), (*Cylindrical bodies, Buckling (Mechanics)), Beams (Structural), Loading (Mechanics), Differential equations, Thermal stresses, Numerical analysis

A simple beam-column model is utilized to study the thermal buckling behavior of similar shells. Closed-form solutions of the governing differential equation are presented for the cases of simply-supported ends and clamped ends. Numerical calculations are performed and the data obtained used to construct equilibrium curves relating the axial load to the axial end shortening and to the midlength lateral deflection. The theoretical curves obtained for the clamped beam-column are in good qualitative agreement with the experimental curves recorded in an equivalent problem of a previous investigation. (Author)

AD-628 957 See Fld. 11/6

AD-628 977 See Fld. 11/6

AD-628 981 See Fld. 13/13

AD-629 061 See Fld. 7/4

AD-629 416 See Fld. 20/4

AD-629 435 See Fld. 12/1

AD-629 441 See Fld. 1/2

AD-629 500 See Fld. 11/6

AD-629 649 See Fld. 12/1

20/12. SOLID STATE PHYSICS

AD-629 033 Fld. 20/12
ILLINOIS UNIV URBANA DEPT OF PHYSICS
PHOTOCONDUCTIVITY OF KBR CONTAINING F CENTERS,
by Richard S. Crandall, and M. Mikkor. 23 Nov 64, 4p. Contract AF 49 (638)-529, Proj. AF-9763, Task 976302,
AFOSR 66-2157

Unclassified report

Availability: Published in The Physical Review v138 n4A pA1247-49 17 May 1965. Copies to DDC users only.

Descriptors: (*Potassium compounds, Bromides), (*Photoconductivity, Potassium compounds), (*Band theory of solids, Photoconductivity), Photons, Electrons, Color centers, Atomic energy levels, Electron transitions, Absorption spectrum

The quantum efficiency or number of conduction-band electrons produced per absorbed photon in the region of the L bands at 21K in KBr was found to be nearly unity. Photoconductivity measurements indicated that the L bands are due to electronic transitions to energy levels which are in the conduction band and that the K band is composed of two or more overlapping optical-absorption bands, of which the higher energy ones are due to electronic transitions to the conduction band. The temperature dependence of the L-band photoconductivity below 45K can be explained by the temperature dependence of the mobility. (Author)

AD-629 048 Fld. 20/12, 9/1, 11/6
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
SOLID STATE RESEARCH 1965-3.
Quarterly technical summary rept. 1 Aug-31 Oct 65,
by Alan L. McWhorter. 15 Nov 65, 70p. Contract AF 19 (628)-5167, Proj. AF-649L
ESD TDR-65-553

Unclassified report

Descriptors: (*Semiconductor devices, Scientific research), (*Lasers, Scientific research), (*Solid state physics, Scientific research), (*Intermetallic compounds, Scientific research), Crystal growth, Lead alloys, Selenium alloys, Indium alloys, Antimony alloys, Semiconductors, Microwave amplifiers, Gallium alloys, Arsenic alloys, Cyclotron resonance phenomena, Chemical bonds, Dielectric properties, Molecular electronics, Piezoelectric crystals, Deposition, Magnetic properties, Spinels, Light, Scattering, Thermodynamics, Magnetism, Transition elements, Chemical compounds, Metals

The report covers in detail the solid state research work at Lincoln Laboratory for the period 1 August through 31 October 1965. The topics covered are Solid State Device Research, Laser Research, Materials Research, and Physics of Solids. (Author)

AD-629 058 Fld. 20/12, 18/4, 20/2
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF PHYSICS
DISLOCATIONS AND NUCLEAR PARTICLE TRACKS IN SILVER CHLORIDE CYRSTALS.
Revised ed.,
by C. B. Childs, and L. M. Slifkin. 15 Feb 65, 13p. Contract AF-AFOSR-450-64, Proj. AF-9761, Task 976103,
AFOSR 65-2112

Unclassified report

Revision of manuscript submitted 21 Dec 64.

Availability: Published in British Journal of Applied Physics v16 p771-80 1965. Copies to DDC users only.

Descriptors: (*Silver compounds, Chlorides), (*Crystal lattice defects, Silver compounds), (*Radiation measurement systems, Crystals), (*Nuclear particles, Detectors), (*Cosmic rays, Detectors), Silver, Deposition, Photoelectric effect, Particle trajectories

Defects such as dislocations and the tracks left by energetic charged particles may be made visible inside large crystals of silver chloride by a photoelectric technique, the net result of which is the deposition of metallic silver along the imperfections. The main advantage of this procedure in the study of dislocations is that large regions of the crystal may be observed in the cold-worked state. For the study of cosmic rays and nuclear events, a convenient and distortion-free detector is offered which may be of use in specialized applications. (Author)

AD-629 069 Fld. 20/12, 20/2
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
EFFECT OF CRYSTAL ANISOTROPY ON THE THERMAL CONDUCTIVITY OF COPPER ALLOYS,
by C. Feldman. 8 Feb 65, 5p. Contract AF-AFOSR-726-65,
AFOSR 65-2548

Unclassified report

Availability: Published in The Physical Review v139 n1A pA211-12 5 Jul 1965. Copies to DDC users only.

Descriptors: (*Copper alloys, Thermal conductivity), (*Anisotropy, Copper alloys), Numerical analysis, Brillouin zones, Crystal lattices

The lattice thermal conductivity of copper alloys has been studied, taking account of the anisotropy of the crystal by using a modified Debye distribution having angular dependence. This is equivalent to replacing the elastic velocities (V sub i) that occur in the usual Debye distribution by V sub i (theta, phi) and multiplying by d omega/4 pi. Lindenfeld and Pennebaker assumed an isotropic crystal and so used the usual Debye distribution in their calculation of the conductivity. Using the expressions for K sub T and K sub L (the contributions to the conductivity from the transverse and longitudinal modes) employed by Lindenfeld and Pennebaker and the elastic velocities found from elastic-constant data, the angular integration for the anisotropic average of the total conductivity was performed by using a Houston's average over the principal crystalline directions. For T/ rho sub 0 > 10 to the 6th power (rho sub 0 is the residual resistivity), the curves of the (conductivity)/T rho sub 0 against T/rho sub 0 are nearly linear, and in this region the largest departure between theory and experiment occur. These calculations give a slope which is approximately 5% lower than the Lindenfeld-Pennebaker theoretical result, while their result gave a slope which was about 650% higher than the experimental one. This indicates that the departure of the calculated conductivity from their experimental results cannot, at least for copper, be accounted for by anisotropy. (Author)

AD-629 089 Fld. 20/12
CALIFORNIA UNIV LA JOLLA
SUPERCONDUCTIVITY OF NB3GE.
Revised ed.,
by B. T. Matthias, T. H. Geballe, R. H. Willens, E. Corenzwit, and G. W. Hull,Jr.. 3 May 65, 6p. Contract AF-AFOSR-631-64, Proj. AF-9760 Task 976002,
AFOSR 65-2125

Unclassified report

Revision of manuscript submitted 1 Mar 65. Prepared in cooperation with Bell Telephone Labs., Inc., Murray Hill, N. J.

Availability: Published in Physical Review, v139 n5A pA1501-3 Aug 30 1965. Copies to DDC users only.

Descriptors: (*Superconductivity, Niobium alloys), (*Niobium alloys, Germanium alloys), Transition temperature, Cryogenics, Intermetallic compounds, Superconductors, Quenching (Cooling)

Evidence is presented to show that the maximum transition temperature of compounds with the

beta-W type structure (A15) occurs at the stoichiometric composition A3B, when B is a nontransition element. The niobium-germanium A15-type compound, which normally forms with excess Nb, has a transition temperature of 6.9K. It has been found that Nb3Ge compounds prepared by rapid-quench techniques, in the presence of excess germanium, have transition temperatures as high as 17K. This large increase in transition temperature is attributed to a closer approach to the stoichiometric 3:1 composition. (Author)

AD-629 090 Fld. 20/12
CALIFORNIA UNIV LA JOLLA
SEARCH FOR SUPERCONDUCTIVITY IN ALPHA-CERIUM,
by T. F. Smith. 28 Sep 64, 5p. Contract AF-AFOSR-631-64,
AFOSR 65-2151

Unclassified report

Availability: Published in Physical Review, v137 n5A pA1435-7 Mar 1 1965. Copies to DDC users only.

Descriptors: (*Cerium, Cryogenics), Superconductivity, Band theory of solids, High-pressure research, Solid state physics

The alpha modification of cerium, formed from the normal, room-temperature modification under a pressure of 10 000 atm, has been cooled to 1.25K and tested for superconductivity. The nature of the state of the 4f electron in alpha-cerium is discussed in relation to the absence of superconductivity. (Author)

AD-629 150 Fld. 20/12
CALIFORNIA UNIV RIVERSIDE DEPT OF PHYSICS
OPTICAL ABSORPTION IN AN ELECTRIC FIELD IN SEMI-INSULATING GALLIUM ARSENIDE,
by L. M. Lambert. 8 Jan 65, 14p. Contract AF-AFOSR-523-64, Proj. AF-9763, Task 976302,
AFOSR 65-2574

Unclassified report

Prepared in cooperation with Aerospace Corp., San Bernardino, Calif.

Availability: Published in The Journal of Physics and Chemistry of Solids v26 p1409-18 1965. Copies to DDC users only.

Descriptors: (*Semiconductors, Optical properties), (*Absorption, Semiconductors), (*Electric fields, Semiconductors), (*Gallium alloys, Arsenic alloys), Insulators, Single crystals, Monochromatic light, Excitation, Theory, Spectrophotometers, Test methods

Optical absorption by semiconductors and insulators in electric fields has been of interest for several decades. Recently, Franz and, independently, Keldysh have presented theories which permit an estimation of the magnitude of effects observed. More recently, Callaway developed a more elaborate formulation which permits accurate computation of absorption coefficients. It is the purpose of this work to present the results of an investigation of Callaway's theory. Optical absorption in oriented single crystals of semi-insulating gallium arsenide was investigated over the temperature range 300K to 85K using non-ohmic contacts and a synchronized pulse train generator. The Cary 14R recording spectrophotometer was used with a spectral purity between 5 A to 9 A in the IR No. 1 mode of operation. The fields used varied between 10,000 to 100,000 V/cm. (Author)

AD-629 151 Fld. 20/12, 20/8
CALIFORNIA UNIV RIVERSIDE DEPT OF PHYSICS
MULTIPLE-SCATTERING METHODS IN THE THEORY OF SOLIDS,
by Joseph Callaway. 30 Apr 65, 17p. Contract AF-AFOSR-523-64, Proj. AF-7963, Task 976302,
AFOSR 65-2593

Unclassified report

Availability: Published in The Physical Review v140 n2A pA618-32 18 Oct 1965. Copies to DDC users only.

Descriptors: (*Solids, Theory), (*Fermions, Ground state), Scattering, Solid state physics, Ferromagnetism, Integral equations, Green's function, Hamiltonian

The formalism of solid-state scattering theory is applied to the construction of the t matrix for a pair of electrons interacting through a repulsive potential of finite range. Expressions for t are obtained in suitable limits for three cases: (1) a potential acting only at a single site and in a single band, (2) a potential acting at a single site but connecting a pair of bands, and (3) a potential acting in a single band but extending to first neighbors. The results are applied to the determination of an optical potential which can be used in a study of the range of excited electrons in metals, and to the determination of the ground-state energy of a low-density system. The ground-state energy is examined as a function of spin alignment, leading to the development of criteria for the occurrence of ferromagnetism in the low-density limit. It is shown that for repulsive, finite -range interactions, ferromagnetism does not occur for very low densities, whatever the band structure is. (Author)

AD-629 173 Fld. 20/12, 7/2
TEXAS UNIV AUSTIN DEPT OF CHEMICAL ENGINEERING
THERMOELECTRIC AND ELECTRICAL MEASUREMENTS IN THE ER-SE SYSTEM.
Revised ed.,
by D. J. Haase, and H. Steinfink. 19 Jul 65, 8p. Contract AF-AFOSR-62-237,
AFOSR 66-0272

Unclassified report

Revision of manuscript submitted 21 May 65.

Availability: Published in Journal of Applied Physics v36 n11 p3490-5 Nov 1965. Copies to DDC users only.

Descriptors: (*Erbium alloys, Electrical conductance), (*Selenium alloys, Thermoelectricity), Semiconductors, Atomic energy levels, Erbium compounds, Selenides, Carriers (Semiconductors), Kinetic energy

An evaluation of the electrical conductivity and thermoelectric power for compounds in the Er-Se system shows that they are degenerate semiconductors. In order to explain the observations in the intrinsic region the number of carriers must be considered as a function of the concentration of the erbium atoms in the compound. Two temperature-dependent processes take place; the activation of impurity levels and the high-temperature activation of localized energy levels associated with the number of erbium atoms present. (Author)

AD-629 174 Fld. 20/12, 7/4
CALIFORNIA UNIV LA JOLLA
PARAMAGNETIC IMPURITIES IN METALS AT FINITE TEMPERATURES,
by H. Suhl. 16 Apr 65, 24p. Contract AF-AFOSR-610-65, Proj. AF-9761, Task 976101,
AFOSR 66-0275

Unclassified report

See also AD-627 627.

Availability: Published in Physics v2 n1 p39-59 1965. Copies to DDC users only.

Descriptors: (*Electrons, Potential scattering), (*Paramagnetic resonance, Impurities), Metals, Nuclear spins, S-matrix, Green's function, Resonance scattering

Dispersion theory is combined with the Green's function technique to discuss the scattering of electrons by paramagnetic impurities in normal metals at finite temperatures. The thermodynamic Green's function is derived from an approximate solution of an equation for a modified (non-unitary) scattering matrix. As a check on the consistency of theory, it is generalized to arbitrary impurity spin S, and shown that in the limit S approaching infinity, it reduces to ordinary potential scattering of electrons with spin parallel or antiparallel to a localized fixed Zeemann field. Some observations are made on the problem of the residual resistance. The effect of additional non-magnetic scattering is briefly considered. A justification is given for the neglect of multiparticle intermediate states in the dispersion equations. (Author)

AD-629 184 Fld. 20/12
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
DE HAAS-VAN ALPHEN EFFECT IN PYROLYTIC AND SINGLE-CRYSTAL GRAPHITE,
by S. J. Williamson, S. Foner, and M. S. Dresselhaus. 17 Jun 65, 21p. Contract AF 49 (638)-1468,
AFOSR 66-0270

Unclassified report

Prepared in cooperation with Lincoln Lab., Mass. Inst. of Tech., Lexington.

Availability: Published in Physical Review v140 n4A pA1429-47 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Graphite, Band theory of solids), (*Atomic energy levels, Oscillation), Single crystals, Magnetic fields, Hamiltonian, Crystal structure, Brillouin zones, Pyrolytic graphite

The de Haas-van Alphen (DHVA) oscillations were observed in the differential susceptibility of wellannealed pyrolytic graphite (PG) with the low-frequency field-modulation technique. Observation of a longperiod, minority-carrier DHVA oscillation in PG and SCG confirms Soule's discovery of such an oscillation in SCG and provides a sensitive test for the SlonczewskiWeiss band model. The minority-carrier oscillation in PG is qualitatively but not quantitatively similar to the one in SCG. This oscillation is attributed to magnetic energy levels passing through the Fermi level near the Brillouin-zone corner at kz=pi/c sub o, where for theta=0 degree there is no extremal area of the Fermi surface at zero field, when spin-orbit interactions are neglected. This interpretation is supported by the calculation of an oscillatory free energy and by the excellent agreement for PG between the predicted values and experimental results for the period, effective mass, period anisotropy, and phase. The phase is not the value which would be predicted from a free-electron model for either a maximal or a minimal cross-sectional area. (Author)

AD-629 187 Fld. 20/12, 20/6
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
FAR-INFRARED ABSORPTION IN N-TYPE SILICON DUE TO PHOTON-INDUCED HOPPING,
by R. C. Milward, and L. J. Neuringer. 13 Sep 65, 6p. Contract AF 49 (638)-1468,
AFOSR 65-2932

Unclassified report

Availability: Published in Physical Review Letters, v15 n16 p664-7 Oct 18 1965. Copies to DDC users only.

Descriptors: (*Infrared phenomena, Semiconductors), (*Semiconductors, Infrared phenomena), Photochemistry, Pumping (Optical), Photons, Silicon, Carriers (Semiconductors), Absorption, Infrared radiation

AD-629 188 Fld. 20/12, 20/2
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
FERRIMAGNETIC STRUCTURE OF MAGNETOELECTRIC GA2-XFEX03,
by R. B. Frankel, N. A. Blum, S. Foner, A. J. Freeman, and M. Schieber. 28 Oct 65, 5p. Contract AF 49 (638)-1468,
AFOSR 66-0277

Unclassified report

Availability: Published in Physical Review Letters, v15 n25 p958-60 Dec 20 1965. Copies to DDC users only.

Descriptors: (*Gallium compounds, Ferromagnetic materials), (*Ferromagnetic materials, Gallium compounds), Iron compounds, Oxides, Single crystals, Crystals, Piezoelectric crystals, Test methods, Mosshauer effect, Magnetic fields, Magnetic moments, Magnetic properties

AD-629 195 Fld. 20/12, 20/3, 11/6
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
UPPER CRITICAL FIELDS OF NB-TI ALLOYS: EVIDENCE FOR THE INFLUENCE OF PAULI PARAMAGNETISM,
by Y. Shapira, and L. J. Neuringer. 28 Jun 65, 9p.
Contract AF 49 (638)-1468,
AFOSR 66-0223

Unclassified report

Availability: Published in The Physical Review v140 n5A pA1638-44 Nov 29 1965. Copies to DDC users only.

Descriptors: (*Niobium alloys, Paramagnetic resonance), (*Titanium alloys, Paramagnetic resonance), Transition temperature, Superconductivity, Resistance (Electrical), Ultrasonic properties, Attenuation, Magnetic fields, Spin stabilization

Resistivity, flow-resistance, and ultrasonic-attenuation measurements were carried out on Nb-37 at.% Ti and Nb-56 at.% Ti in dc magnetic fields up to 150 kG. The transition temperatures and the dependence of the upper critical field on temperature were measured by the resistive method. The transition temperatures are: T (c)=9.2 plus or minus 0.2K for Nb-37 at.% Ti and T (c)= 9.0 plus or minus 0.2K for Nb-56 at.% Ti. Flow-resistance measurements gave the following values for the Ginzburg-Landau-Abrikosov-Gor'kov upper critical field at T=0: 111 plus or minus 7 kG for Nb-37 at.% Ti and 188 plus or minus 9 kG for Nb-56 at.% Ti. Changes in the ultrasonic attenuation were observed near the upper critical field. The data support the view that the Pauli paramagnetism plays a role in determining the upper critical field. However, the effect of the Pauli paramagnetism is found to be smaller than predicted by Maki ('Physics', 1:21 and 127 (1964)). (Author)

AD-629 200 Fld. 20/12, 20/2
CFSTI Prices: HC $1.60 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METALLURGY
FIELD EFFECT MEASUREMENTS ON THE A AND B (111) SURFACES OF INDIUM ANTIMONIDE.
Technical rept.,
by Shinji Kawaji, and Howard Huff. Feb 66,
18p. Rept. no. TR-4,
Contract Nonr-3963 (05) Proj. NR-032-482,

Unclassified report

Descriptors: (*Semiconductors, Surface properties), (*Electrical properties, Semiconductors), (*Indium alloys, Antimony alloys), Electrical conductance, Hall effect, Atomic energy levels, Crystal lattices

Large signal alternating current field effect experiments have been performed at 113K on the A and B (111) 'real' surfaces of InSb exposed to different ambients. Discrete fast surface states were observed near the valence as well as the conduction band edge on both types of surfaces. The discrete state near the conduction band edge exhibited essentially the same density on the A and B surfaces, while the state near the valence band edge was found to be more dense on the B surface. In all cases, both surfaces were p-type, the B surface being invariably more p-type than the A surface. A model is presented according to which the surface state near the conduction band edge is acceptor-like and characteristic of the In atom while the surface state near the valence band edge is also acceptor -like but characteristic of the Sb atom. This model is consistent with the Gatos-Lavine model of the polar surfaces of the III-V compounds. (Author)

AD-629 266 Fld. 20/12, 7/5
MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INSULATION RESEARCH
THERMAL EFFECTS ON THE FLUORESCENCE LIFETIME AND SPECTRUM OF MGO:V (2+).
Revised ed.,
by B. Di Bartolo, and R. Peccei. 6 Nov 64, 7p.
Contract AF-AFOSR-62-317,
AFOSR 65-2774

Unclassified report

Revision of manuscript submitted 20 Aug 1964.

Availability: Published in The Physical Review v137 n6A pA1770-6 15 Mar 65. Copies to DDC users only.

Descriptors: (*Magnesium compounds, Oxides), (*Vanadium, Fluorescence), (*Fluorescence, Vanadium), Single crystals, Impurities, Ions, Relaxation time, Continuous spectrum, Electron transitions, Line spectrum, Phonons, Band spectrum, Thermal properties

The vibronic spectrum associated with the 2E to 4A2 transition at 8700A of MgO:V (2+) was investigated as a function of temperature. The position and the width of the purely radiative (R) line associated with this transition were measured from 4 to 460K, and the total intensity of the fluorescence spectrum from 77 to 650K. At low temperatures vibrational satellites are observed only on the low-energy side of the pure electronic transition, corresponding to spontaneous phonon emission; at higher temperatures they also appear on the high-energy side, corresponding to phonon absorption. With increasing temperature the vibronic bands become more intense relative to the pure electronic transition, the peaks broaden, and multiphonon processes enter and form a fluorescence continuum extending from about 7000 to 10500A. The fluorescence lifetime of the double E level, which is 50 msec and nearly temperature -independent at 77K, decreases rapidly above 200K to about 0.03 msec at 800K. (Author)

AD-629 267 Fld. 20/12, 17/9
NORTHWESTERN UNIV EVANSTON ILL DEPT OF ELECTRICAL ENGINEERING
EQUIVALENCE RELATIONS FOR ECHO AREAS OF DIELECTRIC SOLID CYLINDERS AND CYLINDRICAL SHELLS,
by M. A. Plonus. 1 Apr 65, 8p. Contract AF 49 (638)-1377, Proj. AF-9749, Task 974901,
AFOSR 65-2347

Unclassified report

Availability: Published in Canadian Journal of Physics, v43 p1682-5 Sep 1965. Copies to DDC users only.

Descriptors: (*Radar echo areas, Dielectrics), (*Dielectrics, Cylindrical bodies), Backscattering, Rayleigh scattering

AD-629 291 Fld. 20/12
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
VAPOR TRANSPORT AND THERMODYNAMIC EQUILIBRIA IN THE GERMANIUM-GALLIUM-IODINE SYSTEM,
by R. F. Lever. 21 Apr 65, 15p. Contract AF 49 (638)-1201, Proj. AF-9761, Task 976102,
AFOSR 65-2570

Unclassified report

Availability: Published in J. Phys. Chem. Solids v26 p1629-41 1965. Copies to DDC users only.

Descriptors: (*Germanium, Semiconductors), (*Gallium, Semiconductors), (*Iodides, Semiconductors), Iodine, Thermodynamics, Vapors, Gases, Transport properties, Diffusion, Solid solutions, Doping

Thermodynamic information is used to correlate the composition of germanium-gallium solid solutions with the temperature, pressure and composition of a gas mixture with which the solid is in equilibrium. At temperatures below 1000K, and gallium concentrations in excess of 10 to the 16th power atoms/cu cm of solid, the dominant gas phase species are GaI, GeI2 and GaI3 with the mole fraction of GeI2 in the gas mixture becoming very small at gallium concentrations greater than 10 to the 18th power atoms/cu cm and temperature below 900K. Epitaxial gallium doped germanium layers were grown and their composition found to be close to the calculated equilibrium composition. The growth rate agreed quantitatively with that predicted on the assumption that gaseous diffusion was the rate limiting process. The very low mole fraction of GeI2 prevents rapid quasi equilibrium single crystal growth of heavily doped material at low temperatures. (Author)

AD-629 292 Fld. 20/12, 20/2
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
MAGNETIC PROPERTIES OF CUF2,
by R. J. Joenk, and R. M. Bozorth. 1965, 4p.
Contract AF 49 (638)-1379,
AFOSR 65-2582

Unclassified report

Availability: Published in Journal of Applied Physics v36 n3 pt2 p1167-8 Mar 1965. Copies to DDC users only.

Descriptors: (*Copper compounds, Fluorides), (*Magnetic properties, Copper compounds), Magnetic moments, Ferromagnetic materials, Crystals, Antiferromagnetism, Spin, Crystal lattices

The moment of a pressed powder sample of monoclinic CuF2 was measured from 4.2 to 300K in fields to 25 kOe.chi (T) indicates an AFM transition at T sub n = 69K, and analysis gives g nearly equal to 2.3 and theta nearly equal to - 200K. T sub n and theta are consistent with magnetic ordering of the first kind with AFM exchange interactions J sub 1 (corner-bc) nearly equal to 34K and J sub 2 nearly equal to 22K. Weak ferromagnetism of anisotropic exchange origin is expected on the grounds of symmetry; the measured ferromagnetic moment is sigma sub 0 nearly equal to G cu cm3/mole, corresponding to a canting angle phi nearly equal to 0.01K. Assuming magnetic dipolar anisotropy and estimating principal axes and values for the anisotropic g tensor, we find the spin axis to be about 2 degrees from c and 99 degrees from a in the ac plane with anisotropy field H sub a difference 2000 Oe, and the weak moment to be parallel to the monoclinic axis b with canting field H sub dm difference 1000 Oe. Pseudodipolar anisotropy may be expected to change the orientation, but not the order of magnitude of these fields. The uniform mode AFB resonances are not degenerate in general, but both would be expected to occur at a v/c difference 9/cm using these values. (Author)

AD-629 293 Fld. 20/12, 20/2
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
MAGNETIC PARAMETERS IN NIF2,
by R. J. Joenk, and R. M. Bozorth. 1964, 6p.
Contract AF 49 (638)-1379
AFOSR 65-2581

Unclassified report

Availability: Published in Proceedings of the International Conference on Magnetism Nottingham p493-6 7-11 Sep 1964. Copies to DDC users only.

Descriptors: (*Nickel compounds, Fluorides), (*Magnetic properties, Nickel compounds), Ferromagnetism, Antiferromagnetism, Magnetic moments, Crystals, Anisotropy, Spin, Test methods, Crystal lattices

Using the Moriya model of weak ferromagnetism in NiF2 we have derived from magnetic measurements the various parameters: the canting angle of the spin phi sub 0 = 0.39 degrees and the anisotropy field H sub m = 15.3 kOe that causes it, the axial anisotropy field H sub a = 36.9 kOe that maintains the antiferromagnetic vectors perpendicular to the tetragonal axis, the exchange field H sub e = 1130 kOe and the splitting factor g = 2.31. These quantities are obtained from measurements of moment as a function of field and temperature with the additional use of the antiferromagnetic resonance data of Richards, confirmed by Wheeler, to fix the constant H sub a. (Author)

AD-629 298 Fld. 20/12, 20/2
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
OBSERVATIONS OF 'CLEAN' SURFACES OF SI, GE, AND GAAS BY LOW-ENERGY ELECTRON DIFFRACTION,
by F. Jona. 30 Jun 65, 16p. Contract AF 49 (638)-1201,
AFOSR 66-0271

Unclassified report

Availability: Published in IBM Journal of Research and Development v9 n5-6 p375-87 Sep-Nov 1965. Copies to DDC users only.

Descriptors: (*Semiconductors, Electron diffraction analysis), (*Surfaces, Semiconductors), Silicon, Germanium, Gallium alloys, Arsenic alloys, Crystal lattices, Purification, Vacuum, Heat treatment, Ion bombardment, Heat treatment, Annealing, Surface properties, Crystal structure, Cleaning

The (100), (110) and (111) surfaces of silicon, germanium and gallium arsenide, cleaned in ultra-high vacuum by heat-treatments alone or by ion-bombardments followed by anneals, were studied with the display-type low-energy electron diffraction technique. Most surface structures reported in the literature by others could be reproduced, namely, Si (111)7, Ge (111)8, GaAs (111)2, and GaAs (100)1. Some, however, could not, namely, Si (111)5 and Ge (111)12. Two unreported structures were found to exist, even simultaneously, on the GaAs (100) surface and six different structures were detected on Si (110) surfaces after annealing treatments at different temperatures. The significance of a 'clean' state of semiconductor surfaces, as identified by the observation of low-energy electron diffraction patterns, is discussed. (Author)

AD-629 391 Fld. 20/12
CFSTI Prices: HC $2.60 MF $0.50
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
RESONANT ENERGY TRANSFER BETWEEN EXCITED F-CENTERS IN KI.
Technical rept.,
by Dietmar Frohlich, and Herbert Mahr. 10 Feb 66, 26p. Rept. no. MSC-451,TR-5
Contract Nonr-401 (47)

Unclassified report

Descriptors: (*Color centers, Transport properties), (*Excitation, Color centers), (*Potassium compounds, Iodides), Energy, Resonance, Impurities, Semiconductors, Lasers, Ruby

Resonant energy transfer is observed between excited states of F-centers in KI at 7K by monitoring the decay in time of the excited state population in samples of high concentration of excited states, F. The large population of excited F-centers is obtained with a pulse from a Q-switched Ruby laser. Nonexponential decay curves -- showing an increase over the exponential luminescent decay rate at low concentrations -are found in samples containing more than 2x10 to the 16th power F -centers/cc. It is shown by quantitative comparison of the time decay with theory that the mechanism for resonance transfer is dipole-dipole interaction. For this purpose the rate equation and its solution are derived for the case of transfer among the same states of like species. The individual interaction constant for dipole-dipole interaction is calculated using Dexter's formula. It agrees well with the interaction constant obtained from the experimental results. (Author)

AD-629 423 Fld. 20/12
CFSTI Prices: HC $2.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
NEWS OF INSTITUTIONS OF HIGHER LEARNING. PHYSICS. (SELECTED ARTICLES).
20 Jan 66, 25p. Rept. no. FTD-TT-65-1452,
TT 66-60725

Unclassified report

Unedited rough draft trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Fizika (USSR) n3 p134-43 1964.

Descriptors: (*Semiconductors, Physical properties), (*Cadmium compounds, Sulfides), (*Semiconducting films, Sulfides), Electrical conductance, Mobility, Thickness, Scattering, Absorption spectrum, Sublimation, Optical properties, USSR

Contents: Electric properties of polycrystalline cadmium sulfide films; Concerning the nature of optical absorption of polycrystalline films of cadmium sulfide.

AD-629 429 Fld. 20/12, 7/4, 20/2
CFSTI Prices: HC $4.60 MF $0.50
LINCOLN LAB MASS INST OF TECH LEXINGTON
MAGNETIC STUDIES OF THE ANTIFERROMAGNET RBMNF3.
Technical rept.,
by W. J. Ince. 14 Oct 65, 48p. Rept. no. TR-384,
Contract AF 19 (628)-5167 ,ARPA Order-498

ESD TDR-65-493

Unclassified report

Descriptors: (*Magnetic properties, Rubidium compounds), (*Antiferromagnetism, Rubidium compounds), (*Rubidium compounds, Magnetic properties), Manganese compounds, Fluorides, Anisotropy, Crystal laticies, Field theory, Magnetic resonance, Mathematical analysis, Experimental data

Magnetic properties of the antiferromagnet RbMnF3 were studied. Below T sub N, the magnetic ions order into a two-sublattice system with the spins antiparallel. RbMnF3 exhibits high exchange and low anisotropy; the form of the anisotropy surface is cubic. Consequently, for applied DC magnetic fields less than about 3000 oe, the static equilibrium position of the sublattice magnetization is, in general, multivalued. Measurements of the DC susceptibility chi were made on powder and single crystal specimens of RbMnF3 for the range of applied field 0 to 12 koe and over the temperature range 4.2 to 300K. The observed value of T sub N was about ten degrees higher than the previously published value. When plotted as a function of applied field, chi sub (111) shows no abrupt discontinuity analogous to the spin flopping exhibited by uniaxial antiferromagnets. A simple model, in which H sub DC and M are restricted to the (110) plane, has enabled solutions of the static equilibrium problem to be obtained. X-band resonance experiments are reported, and a resonance theory is presented which incorporates the equilibrium solutions. The predicted antiferromagnetic resonance spectrum shows reasonable agreement with the experimental data. (Author)

AD-629 433 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
HALL COEFFICIENT OF HUBBARD'S MODEL.
Technical rept.,
by David C. Langreth. Feb 66, 22p. Rept. no. TR-11,
Contract Nonr-401 (38),

Unclassified report

Prepared in cooperation with Chicago Univ., Ill. Inst. for the Study of Metals.

Descriptors: (*Hall effect, Transition elements), Solid state physics, Palladium, Platinum, Electrons, Atomic structure

With the aid of the Kadanoff-Baym transport equations, the high field Hall coefficient is calculated for holes in narrow bands according to Hubbard's model. It is found that the inverse Hall coefficient is proportional to the fraction of momentum space occupied by the holes, which in Hubbard's model does not equal the number of holes per atom. Therefore, the holes would not be compensated by the conduction electrons, and it is concluded that Hubbard's model in its present form is inapplicable to evenvalence transition metals such as palladium and platinum. (Author)

AD-629 493 Fld. 20/12
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO
A STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE,
by Frank L. Chan, and Donald A. Brooks. 1964, 19p. Rept. no. ARL-65-269,
Proj. AF-7023, Task 702300 ,702307

Unclassified report

Availability: Published in Advances in X-Ray Analysis v8 p420-30 1965. Copies to DDC users only.

Descriptors: (*Semiconductors, Solid solutions), (*Cadmium compounds, Semiconductors), (*Cadmium alloys, Semiconductors), Sulfides, Selenium alloys, Fluorescence, Phase studies, Chemical analysis, Test methods

The homogeneity of solid solutions of cadmium selenide and cadmium sulfide was investigated. Crystals of the solid solutions having different selenium contents were grown in the Aerospace Research Laboratories by the conventional methods as described in the earlier conferences. The composition of these solid solutions were analyzed chemically for their selenium content by a procedure perfected in the Aerospace Research Laboratories. Crystals in the form of lumps were cut to optimum size suitable to be inserted into the commercially available sample holder. The selenium content of these crystals was ascertained by scanning the samples with stationary collimators of small aperture. The spectograph used for the present study was operated at 75 KVP and 50 mA. The target tube was constructed of molybdenum. The results from the chemical method were used to correlate the counts per second obtained from the X-ray spectrograph. (Author)

AD-629 495 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
CHICAGO UNIV ILL INST FOR THE . STUDY OF METALS
EXPERIMENTAL INVESTIGATION OF THE ELECTRONIC PROPERTIES OF SOLIDS.
Final technical rept.,
by H. Fritzsche. Dec 65, 14p. Contract AF-AFOSR-148-63,

Unclassified report

Descriptors: (*Semiconductors, Scientific research), (*Band theory of solids, Scientific research), Hall effect, Electric properties, Doping, Solids, Tunneling (Electronics), Spectra (Infrared), Ultrasonic radiation

Research progress is reported in the following fields: (1) Study of the Hall effect in liquid metals and alloys; (2) Study of very impure semiconductors; (3) Optical infrared studies of semiconductors; (4) Investigation of the electronic band structure of solids; (5) The use and development of ultrasonic attenuation techniques.

AD-629 508 Fld. 20/12, 20/3
ARMY ELECTRONICS LABS FORT MONMOUTH N J
NEGATIVE MAGNETORESISTANCE IN TELLURIUM,
by Douglas C. Pearce, Robert M. Wasilik, and Donald A. Neeper. 1964, 4p.
Unclassified report

Availability: Published in Low Temperature PhysicsLT9 (Part B) p736-9 1965. Copies to DDC users only.

Descriptors: (*Tellurium, Resistance (Electrical)), ..(*Resistance (Electrical), Magnetic fields), (*Crystal lattice defects, Tellurium), Hall effect, Semiconductors, Electrical properties, Crystal growth

AD-629 514 Fld. 20/12, 20/13
ARMY ELECTRONICS LABS FORT MONMOUTH N J
NIOBIUM OXY-NITRIDES WITH HIGH TRANSITION TEMPERATURES,
by G. K. Gaule, J. T. Breslin, R. L. Ross, J. R. Pastore, and J. R. Shappirio. 1964, 4p.
Unclassified report

Availability: Published in Low Temperature Physics-LT9 (Part A) p612-5 1965. Copies to DDC users only.

Descriptors: (*Niobium compounds, Superconductivity), (*Superconductors, Transition temperature), (*Transition temperature, Control), Oxides, Nitrides, Phase studies, Microstructure

A description is given of preliminary attempts to control the transition temperature in the superconducting Nb (N,O) system.

AD-629 558 Fld. 20/12
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION SYDNEY (AUSTRALIA) DIV OF PHYSICS
THERMAL EXPANSION OF MAGNETIC METALS AT LOW TEMPERATURES,
by G. K. White. 25 Feb 65, 14p. Contract AF-AFOSR-62-391, Proj. AF-9763, Task 976301, AFOSR 65-2590
Unclassified report

Availability: Published in Proceedings of the Physical Society (London) v86 p159-69 1965. Copies to DDC users only.

Descriptors: (*Magnetic materials, Thermal expansion), (*Thermal expansion, Magnetic materials), Cryogenics, Iron, Cobalt, Nickel, Manganese, Chromium, Iron alloys, Nickel alloys, Manganese alloys, Copper alloys

Measurements were made from 2 to 30 K and 60 to 90 K of the thermal expansion of iron, cobalt and nickel, which show that the Gruneisen parameter for the lattice decreases slightly at low temperatures and that the electronic parameter (calculated from the ratio of the electronic contributions to expansion and heat capacity) is about 2.2. Similar measurements below 30 K on alpha-manganese, chromium, face-centred cubic iron-nickel (35-50% Ni) alloys, and Fe 0.5 Mn 0.5 indicate a negative term, proportional to T, in the expansion coefficient. This is particularly large in Invar and in alpha-manganese. For gamma-manganese (+15% Cu) no negative term is observed in the expansion. Results are discussed in terms of electronic and magnetic contributions. (Author)

AD-629 608 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
CORBINO-PME EFFECT AS A POSSIBLE TOOL FOR MICROELECTRONIC MATERIALS EVALUATION: THEORY.
Technical rept.,
by Herbert Mette. Feb 66, 23p. Rept. no. ECOM-2652,
Proj. DA-1P622001A056,
Unclassified report

Descriptors: (*Semiconductors, Measurement), Hall effect, Test equipment (Electronics), Theory, Optical properties, Magnetic properties, Electrical properties, Photoelectrons, Torque, Mobility, Diffusion, Rotation

A method for contactless determination of semiconductor parameters, such as minority carrier mobility or surface recombination velocity, has been theoretically explored and appears to be applicable for the evaluation of very thin and fragile materials as well as small size chips used in microelectronic technology. The effect investigated consists of focusing a sharp light beam on a piece of semiconductor material which is suspended in a magnetic field and measuring the torque caused by the circular flow of photoelectrons. This is called the Corbino-PME (photomagnetoelectric) effect, analogous to the Corbino -Hall and Corbino-Nernst effects, and the general diffusion equations that govern the case have been solved for special boundary conditions. A graphic presentation of the results is presented for various light s ot diameters and surface recombination velocities, and numerical examples are discussed. (Author)

AD-629 615 Fld. 20/12
CATHOLIC UNIV OF AMERICA WASHINGTON D C DEPT OF PHYSICS
FIRST ORDER TRANSITIONS IN SIMPLE MAGNETIC SYSTEMS,
by R. A. Farrell, and P. H. E. Meijer. 1 Sep 64, 26p. Contract AF-AFOSR-445-63, AFOSR 65-2805
Unclassified report

Availability: Published in Physica v31 p725-48 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetic materials, Transport properties), Dysprosium, Electron transitions, Paramagnetic materials, Nuclear spins, Phase studies

The dependence of the critical parameters on the compressibility and the rate of change of the exchange constant is calculated for an Ising-like interaction (long range order only) for spin 1/2, 3/2, 21/2 and infinity. The transition curve consists of a single line in the H-T plane. The complete phase diagram is shown for spin equal to three halves. The same model is studied for a two sublattice antiferromagnet with nearest and second nearest neighbor interactions. This model predicts transitions from the paramagnetic to the ferromagnetic state as the temperature is decreased. At a certain field one finds that the substance goes directly from the paramagnetic state to the ferromagnetic state. The phase diagram shows a triple point. An attempt was made to fit the experimental data available for dysprosium. The application of these same ideas to a two sublattice ferromagnet is discussed, and it is shown that no triple point exists in this case. (Author)

AD-629 654 Fld. 20/12, 20/3
PITTSBURGH UNIV PA DEPT OF PHYSICS
EFFECT OF SURFACE PINNING ON THE MAGNETIZATION OF THIN FILMS,
by James A. Davis. 16 Dec 64, 8p. Contract AF-AFOSR-196-63, Proj. AF-9761 Task 976101, AFOSR 66-0233
Unclassified report

Availability: Published in Journal of Applied Physics v36 n11 p3520-5 Nov 1965. Copies to DDC users only.

Descriptors: (*Films, Magnetic properties), (*Magnetism, Films), Surface properties, Anisotropy, Ferromagnetic materials, Temperature, Electron spin resonance, Field theory

The effect of surface pinning, as manifested by a surface anisotropy field, on the magnetization of thin films is examined in detail for a simple cubic lattice of atoms having spin 1/2 coupled by pure exchange. The magnetization-versus-temperature curve is found to lie above that obtained in the absence of pinning. For very weak pinning (surface anisotropy field much less than surface exchange field), the magnetization is sensitive to film thickness falling off more rapidly than for bulk, in qualitative agreement with some experiments. For intermediate pinning, the magnetization is essentially independent of film thickness, following the bulk behavior, in qualitative agreement with other experiments. For very strong pinning (surface anisotropy field on the order of or greater than surface exchange field), the magnetization falls off slower than for bulk, again with a thickness dependence. As a consequence, one may interpret experimental results in terms of the degree of surface spin pinning. Physically it is not yet clear why the degree of pinning should behave in the required fashion. (Author)

AD-629 657 Fld. 20/12
PITTSBURGH UNIV PA DEPT OF PHYSICS
VARIATIONAL APPROACHES TO THE ANTIFERROMAGNETIC LINEAR CHAIN,
by H. Falk, and Th. W. Ruijgrok. 17 Mar 65, 8p. Contract AF-AFOSR-196-63, Proj. AF-9761, Task 976101, AFOSR 66-0230
Unclassified report

Prepared in cooperation with Instituut voor Theoretische Fysica der Rijksuniversiteit te Utrecht (Netherlands).

Availability: Published in The Physical Review v139 n4A pA1203-8 16 Aug 1965. Copies to DDC users only.

Descriptors: (*Antiferromagnetism, Nuclear spins), Integral equations, Entropy, Linear systems, Hamiltonian

Within the framework of a somewhat general free -energy variational calculation we find that a solution with an energy gap and spontaneous long-range order is favored. However, if on the basis of recent results one disallows the gap, then Bulaevskii's solution, without spontaneous long-range order, obtains. From Bulaevskii's coupled integral equations and the condition for maximum entropy with respect to variation of the external field h at fixed temperature theta, we obtain a pseudophase boundary in the h, theta plane. The analysis indicates that asymptotically along the boundary, (2-h)/theta approaches positive constant as theta approaches 0, and square root of h/ (theta (0)-theta) approaches positive constant as theta approaches theta (0), where (h=0, theta = theta (0) is the intersection of the boundary with the theta axis. Qualitatively similar behavior is displayed by the exactly soluble X-Y model for which the pseudophase boundary is also given here. The boundary curves are compared with one obtained for a finite chain by Bonner and Fisher (Proc. Phys. Soc. (London) 80:508 (1962); Phys. Rev. 135:A640 (1964)). (Author)

AD-629 658 Fld. 20/12, 7/4, 20/2
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
A HYDROGEN-CONTAINING TRAPPED HOLE CENTER IN MAGNESIUM OXIDE,
by Perry W. Kirklin, Peteris Auzins, and John E. Wertz. 20 Nov 64, 11p. Contract AF-AFOSR-200-63,
AFOSR 66-0240

Unclassified report

Availability: Published in The Journal of Physics and Chemistry of Solids v26 p1067-74 1965. Copies to DDC users only.

Descriptors: (*Magnesium compounds, Oxides), (*Color centers, Magnesium compounds), Hydrogen, Electron spin resonance, X rays, Crystal lattice defects, Nuclear magnetic resonance, Band spectrum, Hyperfine structure, Spectrum (Infrared)

Earlier ESR studies of X-irradiated magnesium oxide had shown the existence of centers having a positive hole trapped on an oxygen atom adjacent to a positive ion vacancy (V1-centers). Some MgO samples show a qualitatively similar ESR spectrum with each line a doublet. Electron-nuclear double resonance studies show unambiguously that the splitting arises from a hydrogen atom collinear with the positive hole and the vacancy. Infrared studies of unirradiated MgO had earlier shown a sharp band at 3296/cm, which was observed to be shifted to 3323/cm on irradiation. Decay of the 3323/cm band occurs with corresponding growth of the 3296/cm band and loss of the ESR signal. The 3296/cm band is attributed to an OH (-) ion with hydrogen adjacent to the vacancy. The shift occurs when a hole is trapped on an oxygen opposite the vacancy from the hydrogen atom of OH (-). The new center is referred to as the VOH-center. (Author)

AD-629 659 Fld. 20/12, 7/4, 20/2
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
SPIN STATES OF TRIVALENT CHROMIUM WITH TETRAGONAL SYMMETRY IN MGO,
by Peteris V. Auzins, and John E. Wertz. 15 Apr 65, 6p. Contract AF-AFOSR-200-63,
AFOSR 66-0237

Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n4 p1229-32 15 Aug 1965. Copies to DDC users only.

Descriptors: (*Magnesium compounds, Oxides), (*Crystal lattice defects, Magnesium compounds), (*Chromium, Nuclear spins), Impurities, Ions, Electron transitions, Selection rules, Symmetry (Crystallography), Atomic energy levels, Magnetic fields, Electric fields, Microwave frequency, Electron spin resonance

Spin transitions between nonadjacent energy levels of Cr (3+) in tetragonal symmetry in MgO become allowed by the mixing of states which occurs when the applied magnetic field is not along the symmetry axis. The tetragonal electric field arises from association with a next-nearest-neighbor (nnn) cation vacancy. When the defect axis is perpendicular to the applied field, energy level and matrix element expressions for the -3/2 to 3/2 transition are closely related to those for the normally allowed transitions. Two other transitions between alternate levels (-3/2 to 1/2 and -1/2 to 3/2) become allowed for parallel microwave and tic fields. The ESR lines corresponding to these transitions have been observed. (Author)

AD-629 660 Fld. 20/12, 7/5, 7/4, 20/2
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
THERMOLUMINESCENT FORMATION OF CR (2+) IN MAGNESIUM OXIDE,
by John E. Wertz, and Robert E. Coffman. 16 Feb 65, 3p. Contract AF-AFOSR-200-63,
AFOSR 66-0241

Unclassified report

Availability: Published in Journal of Applied Physics v36 n9 p2959-61 Sep 1965. Copies to DDC users only.

Descriptors: (*Magnesium compounds, Oxides), (*Crystal lattice defects, Magnesium compounds), (*Chromium, Luminescence), (*Luminescence, Chromium), Impurities, Ions, Reduction (Chemistry), X rays, Heating, Symmetry (Crystallography), Iron, Electron spin resonance

In undoped crystals of MgO, x irradiation converts a large fraction of Cr (3+) in octahedral symmetry to Cr (2+). Heating such crystals until a blue thermoluminescence is observed causes further reduction. Usually 95% or more of the Cr (3+) is converted by the combined treatments. However, in Cr-doped MgO one is able to reduce only a small fraction of the octahedral chromium to Cr (2+). The Cr (2+) is reconverted to Cr (3+) by heating. ESR measurements show that in the same temperature interval nearly all of the Fe (1+) formed on x irradiation has disappeared. The source of electrons acquired by Cr (3+) thus appears to be the Fe (1+) ions. The thermoluminescence is ascribed to the Cr (3+)-electron interaction, as suggested by Hansler and Segelken. (Author)

AD-629 661 Fld. 20/12, 7/4, 20/2
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
TRAPPED HOLE CENTER CONTAINING FLUORINE IN MAGNESIUM OXIDE,
by John E. Wertz, and Peteris V. Auzins. 12 Apr 65, 5p. Contract AF-AFOSR-200-63,
AFOSR 66-0239

Unclassified report

Availability: Published in The Physical Review v139 n5A pA1645-7 30 Aug 1965. Copies to DDC users only.

Descriptors: (*Magnesium compounds, Oxides), (*Color centers, Magnesium compounds), (*Fluorine, Color centers), Symmetry (Crystal lattices), X rays, Crystal lattice defects, Electron spin resonance, Hyperfine spectrum

An intrinsic defect center readily induced in MgO by ionizing radiation is the positive hole localized on an oxygen atom adjacent to a positive ion vacancy (V1 center). This has a tetragonal symmetry axis along /001/ or equivalent directions. A similar ESR spectrum but with each line a hyperfine doublet was identified earlier as arising from the center O (+)-/=/H (+)O (V-OH center). This paper describes a similar ESR spectrum of a trapped hole center (V-F) with smaller (anisotropic) hyperfine splitting than V-OH. It is best observed in single crystals, but it may be induced in powdered MgO by fluorine doping and heating. It thus appears that fluorine is the nucleus responsible for hyperfine splitting. The contact and dipolar splitting constants are, respectively: alpha=0.08 G, beta=0.33 G. The proposed model for the V-F center is O (+)-/=/-F (+) (only deviations from normal site symmetry are shown). (Author)

AD-629 688 Fld. 20/12, 20/2, 20/5
CFSTI Prices: HC $4.60 MF $0.50
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS,
by N. Holonyak, Jr., M. D. Sirkis, C. J. Nuese, and C. M. Wolfe. Jun 65, 47p. Rept. no. Scientific 3, Contract AF 19(628)-4337, Proj. AF-4608, Task 460805,
AFCRL 65-648

Unclassified report

See also AD-629 689.

Descriptors: (*Semiconductors, Electrical properties), (*Single crystals, Semiconductors), Gallium compounds, Arsenic compounds, Phosphorus compounds, Preparation, Crystal growth, Crystal lattice defects, Impurities, Doping, Whiskers (Crystals), Lasers

The report is concerned with the preparation, growth, dislocation structure, and electrical properties of single-crystal GaAsP, both filamentary and ingot size, produced by halide vapor transport. The vapor-liquid -solid (VLS) mechanism is shown to play a dominant role in filamentary growth, while Frank spiral growth patterns are often observed on the growing interface of bulk material. Single-crystal GaAsP ingots also grow by nucleation on low-index natural faces, and the possibility of a VLS mechanism being operative in the growth of bulk material is considered. Together with the peculiarities of growth, the phenomenon of crystal habit modification by impurities is observed in the growth of GaAsP for device applications. Since defects in GaAsP may be expected to affect its properties as a semiconductor, the dislocation structure in well-annealed, as-grown ingots is examined and identified by decoration and etching. Dislocation configurations, such as low-angle tilt boundaries, are evaluated and the crystallography of the commonly observed dislocations in bulk material is determined. Finally, the quality and potential of vapor-grown GaAsP as a semiconductor device material are discussed from the standpoint of dislocation structure, measured mobility and carrier densities, and present limitations of the growth process.

AD-629 689 Fld. 20/12, 20/5
CFSTI Prices: HC $1.60 MF $0.50
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS,
by N. Holonyak, Jr., M. D. Sirkis, C. J. Nuese, J. S. Moore, and G. Stillman. Sep 65, 14p. Rept. no. Scientific-4,
Contract AF 19(628)-4337, Proj. AF-4608 Task 460805,
AFCRL 66-18

Unclassified report

See also AD-629 688.

Descriptors: (*Semiconductors, Lasers), (*Lasers, Semiconductors), Gallium compounds, Arsenic compounds, Phosphorus compounds, Diodes (Semiconductor), Zinc, Diffusion, Doping, Silicon, Gold, Cobalt, Oscillation, Electrical properties

Some results of Zn-diffusion in Ga (As (1-x)P (X)) and their effects on laser junctions are summarized. Pulsed operation of Ga (As (1-x)P (X)) lasers to temperatures beyond 200K is described. Self-oscillation phenomena (instabilities) in bulk n-type Si counter-doped with Au or Co are discussed briefly. These oscillations occur at typically 1 Mc or lower frequencies in Co-compensated Si and to well above 100 Mc in Au-compensated Si. (Author)

AD-629 702 Fld. 20/12, 7/4, 8/7
NEW YORK UNIV N Y
REGLES DE SELECTION POUR LA DIFFUSION RAMAN ET L'ABSORPTION INFRAROUGE DANS LA WURTZITE,
by Michel Nusimovici. 1965, 8p. Contract DA-ARO (D)-31-124-G424,
AROD 4054:9

Unclassified report

Text in French.

Availability: Published in Le Journal de Physique v26 p689-96 Nov 1965. Copies to DDC users only.

Descriptors: (*Zinc compounds, Sulfides), (*Minerals, Selection rules), (*Brillouin zones, Zinc compounds), (*Selection rules,

Zinc compounds), Phonons, Distribution, Spectra (Infrared), Absorption spectrum, Raman spectroscopy, Crystal lattices

The irreducible representations of the wurtzite space group corresponding to the gamma, A, M and K points of the Brillouin zone were determined. An analysis of the corresponding phonon spectrum yields selection rules for infrared absorption and Raman scattering processes involving one or many phonons. (Author)

AD-629 716 Fld. 20/12, 20/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
DISAPPEARANCE OF MAGNETOCRYSTALLINE ANISOTROPY EFFECTS ON SPIN RESONANCE OF YIG.
Physical sciences research papers,
by E. Czerlinsky, and P. D. Gianino. 23 Dec 64, 10p. Rept. no. AFCRL-PSRP-172,AFCRL-65-864
Proj. AF-5621, Task 562104,
Unclassified report

Availability: Published in Journal of Applied Physics v36 n6 p1799-1802 Jun 1965. Copies to DDC users only.

Descriptors: (*Ferromagnetic materials, Electron spin resonance), (*Anisotropy, Ferromagnetic materials), Yttrium compounds, Iron compounds, Garnet, Single crystals, Spheres, Magnetic properties

The effect of the magnetocrystalline anisotropy on the resonance of the saturation magnetization vanishes in single-crystal spheres of YIG for a continuous multiplicity of crystalline directions which form a cone about each (100). Consequently, the resonance shift caused by the change of anisotropy with temperature is eliminated when the external magnetic field coincides with any direction lying on this cone. It is shown that deviations from the ideal alignment become inconsequential if they occur in predictable crystallographic planes tangent to this contour. (Author)

AD-628 886 See Fld. 9/3

AD-628 941 See Fld. 20/5

AD-628 946 See Fld. 5/1

AD-628 957 See Fld. 11/6

AD-629 013 See Fld. 11/7

AD-629 014 See Fld. 20/10

AD-629 018 See Fld. 20/3

AD-629 030 See Fld. 20/6

AD-629 062 See Fld. 20/3

AD-629 149 See Fld. 7/4

AD-629 165 See Fld. 11/9

AD-629 185 See Fld. 20/3

AD-629 232 See Fld. 7/4

AD-629 426 See Fld. 20/5

AD-629 483 See Fld. 7/4

AD-629 484 See Fld. 9/3

AD-629 504 See Fld. 7/4

AD-629 565 See Fld. 20/2

AD-629 596 See Fld. 9/5

AD-629 668 See Fld. 20/2

AD-629 709 See Fld. 18/5

AD-629 713 See Fld. 20/2

AD-629 714 See Fld. 20/3

AD-629 734 See Fld. 20/2

20/13. THERMODYNAMICS

AD-629 066 Fld. 20/13
CFSTI Prices: HC $1.60 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
A THEORETICAL INVESTIGATION ON THE EFFECT OF MELTING ON FORCED CONVECTION HEAT TRANSFER.
Research rept.,
by Chi Tien, and Yin-Chao Yen. Oct 65, 17p.
Rept. no. RR-172,
Task 1V014501B52A31,
Unclassified report

Descriptors: (*Convection (Heat transfer), Melting), (*Melting, Convection (Heat transfer)), Phase studies, Ice, Fluids, Solids, Heat transfer, Mathematical analysis

The effect of melting on convective heat transfer between a melting body and surrounding fluid was studied quantitatively from the point of view of boundary layer theory, film theory, and penetration theory. These studies indicate that melting retards the rate of heat transfer, and the decrease in heat transfer coefficient is found to be a unique function of the parameter C sub p delta T/delta H sub m, where delta T is the temperature difference between the fluid and melting body, C sub p is the heat capacity of the fluid, and delta Hm is the enthalpy change due to melting. (Author)

AD-629 137 Fld. 20/13, 20/4
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF MARINE PHYSICAL LAB
ONSET OF CONVECTION IN A LAYER OF FLUID COOLED FROM ABOVE,
by Theodore D. Foster. 3 May 65, 6p. Rept. no. MPL-U-15/65,
Contract Nonr-2216 (05)
Unclassified report

Availability: Published in The Physics of Fluids, v8 n10 p1770-4 Oct 1965. Copies to DDC users only.

Descriptors: (*Convection (Heat transfer), Fluids), (*Fluids, Convection (Heat transfer), Water, Thermodynamics

Experiments were performed in which a layer of water was cooled by evaporation from its top surface. The top surface temperature was measured using an infrared radiometer. The onset of manifest convective behavior was determined by visual observation of the motion of a thin layer of ink at the bottom of the water layer. Within the accuracy of the observations, the experiments show that at large Rayleigh numbers the time needed for the fluid to manifest convective behavior and the horizontal wavenumber of the disturbances amplified most at manifestation of convection are independent of the depth of the fluid layer. (Author)

AD-629 169 Fld. 20/13
CFSTI Prices: HC $1.60 MF $0.50
RAND CORP SANTA MONICA CALIF
INVARIANT IMBEDDING AND THE SOLUTION OF DIFFUSION EQUATIONS,
by Brian Gluss. Feb 66, 14p. Rept. no. rm-4931-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Thermal diffusion, Rods), (*Differential equation, Numerical analysis), Partial differential equations, Integral transforms, Boundary value problems

In this memorandum, invariant imbedding techniques are shown to be applicable to the numerical solution of a heat equation for an inhomogeneous rod, whose straightforward solution can be computationally unstable. This is done by taking the Laplace transform of the equation, which is itself unstable, and then deriving corresponding invariant imbedding equations. (Author)

AD-629 186 Fld. 20/13
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
EQUATION OF STATE OF 4HE IN THE CRITICAL REGION,
by Laszlo Tisza, and C. E. Chase. 25 May 65, 5p.
Contract AF 49 (638)-1468,
AFOSR 65-2585
Unclassified report

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.

Availability: Published in Physical Review Letters v15 n1 p4-6 Jul 5 1965. Copies to DDC users only.

Descriptors: (*Equations of state, Helium), (*Helium, Equations of state), Thermodynamics, Theory, Mathematical analysis

AD-629 247 Fld. 20/13, 21/2
AEROCHEM RESEARCH LABS INC PRINCETON N J
ENHANCED CHEMICAL ENERGY TRANSPORT EFFECTS ON CONVECTIVE HEAT FLUXES IN THE HYDROGEN-OXYGEN SYSTEM,
by D. E. Rosner. Oct 64, 6p. Contract AF 49 (638)-1138,
AFOSR 65-2265
Unclassified report

Availability: Published in Combustion and Flame, Quarterly Journal of the Combustion Institute v9 n2 p199-201 Jun 1965. Copies to DDC users only.

Descriptors: (*Hydrogen, Transport properties), (*Oxygen, Transport properties), Reaction kinetics, Convection (Heat transfer), Rocket propulsion

AD-629 420 Fld. 20/13, 20/4
PURDUE UNIV LAFAYETTE IND
TRANSIENT COOLING OF A SPHERICAL MASS OF HIGH-TEMPERATURE GAS BY THERMAL RADIATION,
by R. Viskanta, and P. S. Lall. 1965, 7p. Contract DA-31-124-ARO (D)-137,
AROD 4282:1
Unclassified report

Availability: Published in Journal of Applied Mechanics p1-7 Dec 1965. Copies to DDC users only.

Descriptors: (*Gases, Cooling), (*Thermal radiation, Cooling), Heat transfer, Spheres, Atmosphere entry, Air, Functional analysis, Approximation (Mathematics), High-temperature research

The paper considers the transient cooling of a spherical mass of high-temperature gas which is surrounded by the cold atmosphere. The ionization and dissociation phenomena are neglected, and it is assumed that energy transfer by convection is negligible in comparison to radiation. The radiation transfer problem was formulated exactly. For the case of a gray gas, approximate solutions are obtained for the temperature inside the sphere as functions of time and space coordinate by the method of moments. The local radiation flux is then evaluated for two different initial temperature distributions and several value of the optical radius. (Author)

AD-629 536 Fld. 20/13, 20/4
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
ON BOLTZMANN'S H-THEOREM,
by Harold Grad. 9 Sep 64, 21p. Contract AF-AFOSR-62-266, AFOSR 65-2334
Unclassified report

Availability: Published in J. Soc. Indust. Appl. Math. v13 n1 p259-77 Mar 1965. Copies to DDC users only.

Descriptors: (*Theorems, Thermodynamics), (*Special functions (Mathematical), Entropy), Distribution functions, Partial differential equations, Statistical mechanics

It is a classical result for solutions of the Boltzmann equation that Boltzmann's H-function, decreases monotonically with time, but ceases to decrease if the distribution function becomes locally Maxwellian. If, after a time, the system were to beome precisely locally Maxwellian it would cease to be dissipative and the H -function (which then reduces to the negative thermodynamic entropy) would henceforth remain constant at a value higher than that appropriate to thermodynamic equilibrium. In order to demonstrate an approach to equilibrium, it is necessary to show not that the distribution approaches a Maxwellian, but that it does not approach a local Maxwellian too closely or too soon. In this paper we prove, for a general form of linear Boltzmann equation, that under appropriate boundary conditions all solutions approach equilibrium. The proof uses recent strong estimates of solutions of the linear Boltzmann equation.

AD-629 684 Fld. 20/13, 22/1
CFSTI Prices: HC $3.60 MF $0.50
JASON DIV INST FOR DEFENSE ANALYSES ARLINGTON VA
RF BREAKDOWN NEAR A CONICAL RE-ENTRY BODY.
Research paper,
by Kenneth M. Case, Marvin L. Goldberger, Samuel B. Treiman, and Kenneth M. Watson. Jul 65, 37p. Rept. no. RP-P-202,IDA/HR 65-4071 Contract SD-50,
Unclassified report

Descriptors: (*Radio transmission, Atmosphere entry), (*Reentry vehicles, Radio transmission), Conical bodies, Diffusion, Microwaves, Numerical analysis, Mathematical models

The paper provides a basis for a detailed description of rf breakdown of the atmosphere in the vicinity of a conical re-entry vehicle which is transmitting an rf signal to earth. It derives relatively simple equations governing the electromagnetic, chemical, and hydrodynamic processes accompanying breakdown near a re-entry vehicle. An application is made to several idealized models. (Author)

AD-629 719 Fld. 20/13, 14/2
CFSTI Prices: HC $5.00 MF $1.00
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH FLIGHT SCIENCES LAB
TURBULENCE MEASUREMENTS WITH INCLINED HOT-WIRES,
Doctoral thesis,
by F. H. Champagne. Dec 65, 168p. Rept. no. D1-82-0491, Flight Science Lab-103
Unclassified report

Also available from the Author.

Descriptors: (*Turbulence, Measurement), (*Thermodynamics, Anemometers), Heat transfer, Temperature, Distribution, Convection (Heat transfer), Velocity, Calibration

The results of the heat transfer and temperature distribution measurements indicate that an inclined hot-wire is sensitive to the tangential velocity component along the wire. The temperature distribution measurements indicate that inclined and normal wires have nearly identical end conduction losses, although the temperature distribution on an inclined wire is slightly asymmetrical. Therefore, the deviation from the cosine law is caused by an increase in the convection heat loss attributable to the tangential component of velocity. The sensitivity of an inclined hot-wire to the tangential velocity component must be taken into consideration when interpreting hot-wire data in terms of velocity components of a flow field. The wire is best calibrated directly at all desired yaw angles.

AD-628 889 See Fld. 7/4

AD-628 911 See Fld. 20/9

AD-629 096 See Fld. 9/2

AD-629 213 See Fld. 20/4

AD-629 227 See Fld. 21/5

AD-629 262 See Fld. 20/9

AD-629 486 See Fld. 12/1

AD-629 514 See Fld. 20/12

AD-629 570 See Fld. 11/2

AD-629 616 See Fld. 20/10

AD-629 745 See Fld. 20/2

20/14. WAVE PROPAGATION

AD-628 986 Fld. 20/14
CFSTI Prices: HC $4.00 MF $0.75
NAVAL RESEARCH LAB WASHINGTON D C
VLF RELATIVE PHASE PREDICTIONS FOR SELECTED TRANSMISSION PATHS.
Memorandum rept.,
by W. E. Garner, and R. L. Schauer. 14 Feb 66, 118p. Rept. no. NRL-MR-1670,
Unclassified report

Descriptors: (*Very low frequency, Radio transmission), (*Radio transmission, Ionospheric propagation), (*Ionospheric propagation, Radio waves), Phase measurement, Radio fields, Radiofrequency power, Mathematical prediction, Graphics

Predictions of the relative phase of seven very-lowfrequency (vlf) transmissions as received at selected receiver locations, during the summer and winter solstice, and the spring and fall equinox, are presented. The vlf transmitting stations and the operating frequencies considered are NWC (15.5 kc/s), NPM (26.1 kc/s), NPG (18.6 kc/s), NAA (17.8 kc/s), NBA (24.0 kc/s), NSS (21.4 kc/s), and GBR (16.0 kc/s). The receiving locations used are Guam, Honolulu, San Francisco, San Juan, Norfolk, Keflavik, Port Lyautey, and Asmara. However, predictions are not presented for all the transmitter-receiver location combinations given above. (Author)

AD-629 108 Fld. 20/14, 9/5
CFSTI Prices: HC $3.00 MF $0.75
MELPAR INC FALLS CHURCH VA
ERROR ANALYSIS OF FRESNEL-RING FOCUSING.
Final rept.,
by A. P. Murphy. Feb 66, 67p. Contract AF 30(602)-3774, Proj. AF-4540, Task 454002, RADC TR-65-434
Unclassified report

Descriptors: (*Antenna radiation patterns, Measurement), Errors, Field theory, Focusing, Optimization, Synthesis

A general end-fire array design technique (called Fresnel-ring focusing) for direct extrapolation of far-field data from near-field data has been analyzed with regard to systematic and random errors. Criteria are developed for sufficiency of the Fresnel approximation with arbitrary array design, array element gain, and the restrictions of mutual coupling that demonstrate feasibility of the technique for a practical problem. Consideration is given to focusing processes and types of optimization synthesis. Array optimization is achieved by design variation to minimize random errors. The end-fire array designs attained have 'super-gain' properties that make the technique impractical. (Author)

AD-629 226 Fld. 20/14
CFSTI Prices: HC $11.60 MF $0.75
DEFENSE RESEARCH LAB UNIV OF TEXAS AUSTIN
EFFECTS OF TOPOGRAPHY AND REFRACTIVE INDEX ON LOW-ANGLE 3 CM RADIO WAVES.
Technical rept.,
by Hugh T. Tomlinson. Aug 58, 117p. Rept. no. DRL-428 ,CF-2710
Contract NOrd-16498, Task UTX-1,
Unclassified report

Descriptors: (*Radio waves, Propagation), Terrain, Meteorological parameters, Atmospheric refraction, Refractive index, Microwaves, X band, Radiofrequency interference

This report describes a series of radio propagation tests and the analysis of the data obtained. The purpose of the tests was to study the effects of meteorological and terrain conditions on horizontally-radiated 3 CM radio waves. Terrain effects were measured by recording field intensity patterns as a function of height, using the elevator of a 275 foot tower to carry the receiver. Several transmission paths were used to determine the effect of different types of terrain. The magnitude of the field intensity changes indicated effective coefficients of reflection of 0.1 to 0.4 for both horizontal and vertical polarizations. One transmission path provided an excellent example of knife-edge diffraction. Diurnal movements of height-gain patterns were effectively related to changes in the index of refraction of the transmission atmosphere. By using the differential change in average index of refraction for the direct and reflection paths, an agreement between calculated and measured direction of null movement was obtained in 29 out of 34 cases. (Author)

AD-629 319 Fld. 20/14, 8/14, 4/1
CANADIAN SERVICES COLL VICTORIA (BRITISH COLUMBIA)
RADIO FADING AND THE NATURAL ELECTROMAGNETIC BACKGROUND,
by H. J. Duffus, G. H. Boyd, and J. K. Kinnear. 3 Mar 65, 15p. Contract DRB-D9511-37,
Unclassified report

Availability: Published in Canadian Journal of Physics v43 p1951-61 Nov 1965. Copies to DDC users only.

Descriptors: (*Radiofrequency interference, Terrestrial magnetism), (*Terrestrial magnetism, Radiofrequency interference), (*Radio waves, Propagation), Ionospheric propagation, Attenuation, Magnetic storms, Broadband, Microwave frequency, Radio signals

A comparison is made between the natural geomagnetic background in the frequency range 0.006-0.6 Hz and fluctuations of the difference in received signal strength between the two magnetoionic modes of vertically incident broad-band radio signals in the range 6-16 MHz, observed at a single station near Victoria, British Columbia.

AD-629 325 Fld. 20/14, 9/5
UNIVERSITY OF WESTERN ONTARIO LONDON DEPT OF PHYSICS
A METHOD OF DETERMINING CROSS-CORRELATION COEFFICIENTS OF TIME-VARYING SIGNALS,
by F. H. Palmer, and G. F. Lyon. 23 Sep 65, 9p. Contract DRB-2801-18,
Unclassified report

Availability: Published in Canadian Journal of Physics v44 p415-22 1966. Copies to DDC users only.

Descriptors: (*Correlators, Radio signals), (*Radio signals, Correlators), Ionospheric propagation, Electron density, Very high frequency, Attenuation, Correlation techniques

Pulse-counting techniques allow the cross-correlation coefficient between two time-varying signals to be rapidly evaluated, if the two signals are first converted to pulse trains whose repetition frequencies are proportional to the respective amplitudes. Equipment using this technique is described. Estimates are given of the overall accuracy of the device for various types of input signal and for various signal durations. Provided the depth of modulation of the signals is over 50%, their cross-correlation coefficient may be determined to an accuracy of plus or minus 0.05 for sample lengths of 2 minutes. The application of the system to the determination of cross-correlation coefficients of v.h.f. forward-scattered signals received on spaced antennae is also described. (Author)

AD-629 331 Fld. 20/14, 4/1
CENTRAL RADIO PROPAGATION LAB BOULDER COLO
FURTHER OBSERVATIONS OF SUNRISE AND SUNSET FADING OF VERY-LOW-FREQUENCY SIGNALS,
by D. D. Crombie. 15 Jul 65, 6p. Contract NSF-GP-3092 ,ARPA Order-183

Unclassified report

Availability: Published in Radio Science v1 n1 p47-9 Jan 1966. Copies to DDC users only.

Descriptors: (*Radiowaves, Ionospheric propagation), (*Ionospheric propagation, Radio waves), Atmosphere, Light, Diurnal variations, Radiofrequency interference, Very low frequency, Radio signals

An earlier explanation of sunrise fading on long VLF paths is confirmed by examining data taken over a wider range of frequency and directions of propagation. It is found, however, that there is an appreciable dependence of the fading period on the magnetic direction of propagation. It is shown that this dependence is qualitatively in agreement with what would be expected from a sharply bounded ionosphere and a transverse magnetic field. (Author)

AD-629 645 Fld. 20/14, 9/5
CFSTI Prices: HC $2.00 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
GROUND SYSTEM EFFECT ON HIGH FREQUENCY ANTENNA PROPAGATION,
Research rept. Jul 63-Jul 65,
by W. E. Gustafson, W. M. Chase, and N. H. Balli. 4 Jan 66, 30p. Rept. no. NEL-1346,
Proj. SF-006-03-04, Task 7048,

Unclassified report

Descriptors: (*Antenna radiation patterns, High frequency), (*Radio waves, Propagation), Antennas, Ground (Electrical), Wire, Nets, Electromagnetic properties

Model and analytical studies show that large ground screens produce significat improvement in low-angle radiation from high frequency antennas on imperfect earth. At frequencies of 10 to 30 Mc/s radiation can be improved 5 to 7 dB by ground screens with a radius of 2.5 to 7.5 wavelengths. (Author)

AD-629 728 Fld. 20/14, 17/2.1
CFSTI Prices: HC $11.60 MF $0.75
NAVAL AIR TEST CENTER PATUXENT RIVER MD WEAPONS SYSTEMS TEST DIV
SPECTRUM SIGNATURE OF RADIO SET AN/GRC-27A.
Final rept.,
by Thomas R. Cathey, James E. Browne, and Carl L. Lennon. 19 Jan 61, 114p. Rept. no. WST07-26,
Proj. NE050418,

Unclassified report

Descriptors: (*Spectrum signatures, Radio equipment), (*Radio equipment, Spectrum signatures), Radio receivers, Antennas, Bandwidth, Reliability (Electronics), Radiofrequency interference, Radio transmitters, Noise (Radio)

Spectrum signature measurements which include receiver bandwidth, receiver susceptibility, receiver antenna terminal radiation, transmitter antenna terminal spectrum, and transmitter conducted interference were made on Radio Set AN/GRC-27A. Additional tests were conducted to determine reliability of the available power method of making receiver susceptibility measurements. A study of the causes of the receiver's susceptibility to spurious frequencies was also conducted. The receiver was susceptible to many spurious frequencies and numerous spurious outputs of the transmitter were found. (Author)

AD-628 906 See Fld. 20/9

AD-628 910 See Fld. 20/9

AD-628 946 See Fld. 5/1

AD-628 971 See Fld. 4/1

AD-629 153 See Fld. 20/6

AD-629 155 See Fld. 9/5

AD-629 196 See Fld. 19/1

AD-629 224 See Fld. 19/1

AD-629 310 See Fld. 4/1

AD-629 320 See Fld. 20/3

AD-629 332 See Fld. 4/1

AD-629 356 See Fld. 4/1

AD-629 430 See Fld. 4/1

AD-629 449 See Fld. 4/1

Field 21-PROPULSION AND FUELS

21/2. COMBUSTION AND IGNITION

AD-628 920 Fld. 21/2, 21/8
CFSTI Prices: HC $3.60 MF $0.50
DUBLIN UNIV (EIRE) SCHOOL OF ENGINEERING
MECHANICAL VIBRATION; A DRIVING MECHANISM FOR COMBUSTION INSTABILITY IN ROCKET ENGINES.
Technical rept.,
by P. D. McCormack, David Cochrane, and L. Crane. Nov 65, 32p. Contract AF-EOAR-43-65,
AROSR 66-0404

Unclassified report

Descriptors: (*Vibration, Rocket motors), (*Rocket motors, Vibration), (*Combustion, Stability), Jet flames, Photographic analysis, Spectroscopy, Jet mixing flow, Vortices, Theory, Erie

The mixing and burning of gas/air jets in the presence of mechanical vibration of the injector was studied. Initial photographic Schlierer and spectroscopic observations of a H2/air and coa gas/air flame vibration conditions have been carried out. The vibration obviously enhances the rate of mixing and higher mean flame temperatures result. A closed solution was obtained for the case of a vibrated gas jet mixing with its surroundings, in the near-field (potential core) region. Generally speaking, the theory predicted that the vibration treated as a source of vorticity, would raise the mean axial component of velocity at any point inside the mixing region. This was verified by a hot wire anemometer investigation. Furthermore, it was established that the vibration drives the vortex shedding mechanism in the flow from an orifice. (Author)

AD-628 931 Fld. 21/2, 21/9.2
CFSTI Prices: HC $4.60 MF $0.50
PRINCETON UNIV N J DEPT OF AERO-SPACE AND MECHANICAL SCIENCES
IGNITION OF AN EVAPORATING FUEL IN A HOT OXIDIZING GAS, INCLUDING THE EFFECT OF HEAT FEEDBACK.
Final technical rept. 1 Oct 63-30 Sep 64,
by Clarke E. Hermance, Reuel Shinnar, and Martin Summerfield. Feb 66, 47p. Rept. no. Aerospace/Mechanical Sci-752,
Contract AF 49 (638)-1267, Proj. AF-9751 Task 975101,
AFOSR 66-0409

Unclassified report

Descriptors: (*Solid rocket fuels, Ignition), (*Ignition, Theory), Evaporation, Solid rocket oxidizers, Vapors, Rocket igniters, Heat, Feedback, Shock tubes, Gases, Thermal conductivity, Surface temperatures

The purpose of the research was to explore theoretically the phenomenon of ignition of a condensed phase fuel by a stationary hot igniting gas containing an oxidizing constituent. This theoretical development is one step in the larger problem of the ignition of a solid propellant by a stream of hot reactive gas generated by a pyrogen-type igniter. The theory has direct application to previous and concurrent ignition experiments of fuels in shock tubes. The most significant finding is that solid fuels having very low volatilities can ignite via a gas phase reaction mechanism in times as short as a millisecond. The essential physical process that makes this possible is the feedback of heat by conduction to the surface from the incipient reaction zone that starts in the gas phase. The predictions of the theory with respect to the effects of pressure and oxygen content in the gas phase on ignition delay are in qualitative agreement with shock tube experimental results. The theory has broader significance as a first rigorous penetration into the domain of diffusion limited ignition reactions as distinguished from the classical domain of auto-thermal ignitions in homogeneous explosive media. (Author)

AD-628 896 See Fld. 21/8

AD-628 915 See Fld. 19/4

AD-629 026 See Fld. 21/8

AD-629 247 See Fld. 20/13

AD-629 585 See Fld. 21/9

21/3. ELECTRIC PROPULSION

AD-629 168 Fld. 21/3
CFSTI Prices: HC $5.00 MF $1.00
GIANNINI SCIENTIFIC CORP SANTA ANA CALIF
STUDY OF THE FACTORS AFFECTING THE EFFICIENCY IN THERMAL ACCELERATION OF PROPELLANTS.
Final technical rept., 1 May 62-30 Apr 65,
by Adriano C. Ducati. 31 Aug 65, 181p. Rept. no. FR-085-1161,
Contract AF 49 (638)-1161, Proj. AF-9751, Task 975101,
AFOSR 66-0495

Unclassified report

Descriptors: (*Arc-jet engines, Performance (Engineering)), Heaters, Test facilities, Propellants, Injection, Plasma jets, Nozzles, Propulsion, Vapors, Metals, Magnetic pinch

The report describes the experimental and analytical work conducted to study the various influences affecting the operating characteristics of electrothermal accelerators. A survey of the testing facilities, including vacuum systems, resistance heaters, and liquid metal heaters is given. The experimental work conducted with hydrogen, helium, ammonia, nitrogen, oxygen, and argon at temperatures ranging from 300K to 3000K is described. Conical and annular nozzles are compared with simple cylindrical throats, and the experimental and analytical expressions relative to their behavior are included. Outlined are the development of low pressure arc heaters and the experiments which led, for the first time, to the attainment of specific impulse levels of over 10,000 seconds using hydrogen. Performance comparisons between resistance and arc heating and associated anomalies using ammonia are also discussed. The behavior of self-magnetic fields in the arc heater is explained, together with the effects of externally applied magnetic fields ranging from 500 to 12,000 gauss. Included are operation at low mass flow rates and the development of arc heaters working without propellant throughput using electrode vapors or residual ambient gas as the working fluid. (Author)

21/5. JET AND GAS TURBINE ENGINES

AD-629 227 Fld. 21/5, 20/13
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
AN ASYMPTOTE SOLUTION TO THE PROBLEM OF DETERMINING THE TEMPERATURE OF GAS TURBINE BLADES,
by I. S. Lyubchenko, and V. A. Tupchiev. 20 Jan 66, 17p. Rept. no. ftd-TT-65-1443, TT 66-60698

Unclassified report

Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 1: Matematika, Mekhanika (USSR) v20 n1 p52-60 1965.

Descriptors: (*Gas turbine blades, Temperature), Determination, Heat transfer, USSR

Problem in current gas turbine construction is that of increasing the working temperature of the gas. As is known, this leads to increased efficiency, and a reduction in the size and weight of gas turbines. However, the design of high temperature gas turbines encounters serious difficulties in connection with the limited capabilities of the metal of elements in the flow-through portion to stand up under increased temperature potentials. The most heavily worked turbine elements are the work blades which operate under conditions of elevated mechanical and temperature stresses. Naturally, when designing a gas turbine it is very important to know how to calculate the temperature field in the blade body taking into account variation along the radius of heat transfer, and of the perimeters and areas of cylindrical cross sections. (Author)

AD-629 474 Fld. 21/5
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ON THE APPROXIMATE MODELING OF COMBUSTION CHAMBERS OF GAS TURBINES ON NATURAL GAS,
by A. A. Shatil, and V. D. Murashko. 18 Feb 66, 20p. Rept. no. FTD-TT-65-1777, TT 66-60734

Unclassified report

Unedited rough draft trans. of Teploenergetika (USSR) n7 p54-8 1965.

Descriptors: (*Combustion chambers, Mathematical models), (*Gas turbines, Combustion chambers), Approximation (Mathematics), Fuels, Combustion, USSR

21/8. ROCKET MOTORS AND ENGINES

AD-628 894 Fld. 21/8, 14/2
CFSTI Prices: HC $4.60 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
APPARENT-WEIGHT MEASUREMENTS OF ROCKET PAYLOAD AND TEST STRUCTURES.
Memo. rept.,
by R. O. Belsheim, and J. J. Harris. Dec 60, 44p. Rept. no. NRL-MR-1099,
Contract NASA Order-5-81-71-G11 Proj. RR-009-03-41-5751,

Unclassified report

Descriptors: (*Rocket motors, Captive tests), Weight, Test methods, Vibration, Acceleration, Thrust, Performance (Engineering), Mechanical properties, Determination, Payload

The report describes a series of apparent-weight measurements of (a) two static thrust cell-test bay assemblies, located at the Allegany Ballistics Laboratory (ABL), (b) the ABL X-248 motor installed in the static firing stand, and (c) several 'representative' rocket payloads. The procedure used in obtaining these measurements is described in some detail. Since this information was desired to ensure greater confidence in the quantitative levels of motor-induced oscillatory forces (600 cps) observed during earlier firings, the behavior at this frequency was studied most closely. However, the results also show how these several structures may be modeled, mathematically, for analysis pruposes. The studies illustrate the usefulness of these mechanical-impedance type measurements when dynamic loads are of importance. (Author)

AD-628 920 **See Fld. 21/2**

AD-629 120 **See Fld. 20/9**

21/8.2 SOLID ROCKET MOTORS

AD-628 896 Fld. 21/8.2, 21/2
CFSTI Prices: HC $7.60 MF $0.75
NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF
ACOUSTIC LOSSES OF A SUBSCALE, COLD-FLOW ROCKET MOTOR FOR VARIOUS 'J' VALUES.
Research rept. Oct 64-Jul 65,
by F. G. Buffum, G. L. Dehority, R. O. Slates, and E. W. Price. Feb 66, 77p. Rept. no. NOTS-NAVWEPS 8971

Unclassified report

See also AD-619 691.

Descriptors: (*Rocket motors (Solid Propellant), Acoustic properties), (*Cold flow tests, Rocket motors), Rocket research, Model tests, Combustion, Stability, Rocket motor nozzles, Nozzle area ratio

Acoustic dissipation studies were undertaken using a subscale, cold-flow rocket motor model to determine the effect of purely geometric variables on the acoustic performance leading to axial mode combustion instability. Cold air served as the working fluid to simulate the internal flow and o obtain a critical nozzle throat condition. Using interchangeable metal parts, it was possible to simulate the geometry of a cylindrical-bore grain at various real motor burn times and also to vary the nozzle throat diameter. The results confirmed the speculation that, for practical motor designs, the radiation of acoustic energy through the nozzle is the largest source of loss for the axial mode and increases with the J of the motor. In view of the change in J with time during burning, this loss can vary conspicuously during the motor burn time. (Author)

AD-629 026 Fld. 21/8.2, 21/9.2, 21/2
AEROJET-GENERAL CORP AZUSA CALIF
A MODEL FOR LOW-PRESSURE EXTINCTION OF SOLID ROCKET MOTORS,
by R. F. Chaiken. 21 Oct 64, 4p. Contract AF 49 (638)-851, Proj. AF-9713, Task 971301, AFSOR 65-2166

Unclassified report

Availability: Published in AIAA Journal, v3 n6 p1144-6 Jun 1965. Copies to DDC users only.

Descriptors: (*Rocket motors (Solid propellant), Stability), (*Composite propellants, Combustion), Low-pressure research, Theory, Deflagration, Flames, Reaction kinetics, Aluminum, Ammonium compounds, Perchlorates

A new model is offered as an explanation of the observation that aluminized ammonium perchlorate composite propellants exibit a low-pressure burning limit that is generally higher than the low-pressure stable deflagration limit as determined in a strand burner. The model resolves some of the difficulties encountered when attempting to identify criteria for low-frequency instability with low-pressure extinction criteria, and it enables a treatment of extinction in terms of kinetics of propellant flame reactions.

21/9. ROCKET PROPELLANTS

AD-628 923 **See Fld. 7/2**

21/9.2 SOLID ROCKET PROPELLANTS

AD-629 070 Fld. 21/9.2, 14/2
PURDUE UNIV LAFAYETTE IND SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS MEASUREMENT OF SOLID PROPELLANT BURNING RATES,
by J. R. Osborn, R. J. Burick, and R. F. Panella. 30 Jul 64, 7p. Contract AF-AFOSR-207-63,

Unclassified report

Availability: Published in The Review of Scientific Instruments, v37 n1 p86-92 Jan 1966. Copies to DDC users only.

Descriptors: (*Solid rocket propellants, Burning rate), (*Burning rate, Test methods), Measurement, Rocket motors, Servomechanisms, Positioning devices (Machinery), Test equipment, Performance (Engineering)

An experimental system is presented for the direct and continuous measurement of the burning rates of solid rocket propellants under conditions closely approximating those of a solid rocket motor. The system involves a positioning type servomechanism which moves a sample of solid propellant within a two dimensional rocket motor such that the receding burning surface of the sample is maintained at a fixed position with respect to the motor. Since the burning surface remains fixed, the direct measurement of the velocity of the propellant feed mechanism for adjusting the position of the propellant sample yields the burning rate. The servomechanism incorporated a 50 m Ci (137)Cs source of gamma rays coupled with a scintillation probe for detecting the position of the burning propellant surface. The output of the probe was converted into a voltage by a ratemeter. It was then amplified and compared to a standard voltage which was proportional to a desired propellant surface position. The resulting difference was amplified for the purpose of driving a 0.6 hp servomotor which positioned the burning surface of the propellant sample. The size of the sample was approximately 2.5 cm square by 10 cm long. The experimental data were obtained with the above servomechanism for two composite propellant formulations. (Author)

AD-629 585 Fld. 21/9.2, 21/2
CFSTI Prices: HC $3.60 MF $0.50
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
RESEARCH ON SOLID PROPELLANT COMBUSTION INSTABILITY.
Final summary rept., 1 Jan-30 Sep 64,
by R. H. Woodward, and Martin Summerfield.
Feb 66, 31p. Rept. no. AMS-766,
Contract AF-AFOSR-448-63, ARPA Order-317-62 Proj. AF-9711, Task 971101,
AFOSR 66-0578

Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Stability), Acoustics, Oscillation, Temperature, Flames, Composite propellants, Ammonium compounds, Perchlorates, Nitrocellulose

A search was made for predicted temperature waves using a 2-inch diameter T-burner as the source of oscillating pressure, in order to confirm the observations of Wood (9th Symposium on Combustion, p. 335, 1963), and then to measure the pertinent parameters, namely temperature, amplitude and phase. Unfortunately, no waves of the predicted type were found. However, waves similar to those of Wood were observed reproducibly when burning was allowed on the sides of an uninhibited test sample, i.e., in a non-one-dimensional situation, but even so these waves were much weaker than the temperature variations that were expected. Various reasons for the non-occurrence of the expected temperature waves are considered. The most likely explanation is that the model of the gas phase reaction zone originally assumed, namely, a thin one-stage reaction zone is partially in error. Instead, it appears that the gaseous zone may be composed of two portions - a thin primary zone near the surface needed in order to account for the observed burning rates, and a diffuse after - burning zone where the combustion reactions go to completion. Such a spread in the reaction zone would imply a longer total reaction time, thus introducing strong interaction phenomena that had been ruled out in the so-called 'zero-frequency' description. The conclusion to be drawn from this research is that the steady-state model used in the temperature waves is partially in error.

AD-628 931 See Fld. 21/2

AD-629 026 See Fld. 21/8

Field 22-SPACE TECHNOLOGY

22/1. ASTRONAUTICS

AD-629 425 Fld. 22/1, 3/1
CFSTI Prices: HC $4.60 MF $0.50
RAND CORP SANTA MONICA CALIF
LOGISTIC IMPLICATIONS OF AN ASTRONOMICAL OBSERVATORY ON THE MOON,
by R. J. Freeman, R. C. Moore, and G. F. Schilling. Feb 66, 42p. Rept. no. RM-4916-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Logistics, Lunar bases), (*Lunar bases, Logistics), (*Astronomical observatories, Moon), (*Moon, Astronomical observatories), Space probes, Extraterrestrial bases, Feasibility studies, Astronautics, Mathematical models

A study of one aspect of possible post-Apollo space activity-a program of astronomical research on the moon that culminates in the establishment of a lunar observatory. A mathematical model is used to analyze the logistics implications of conducting such an astronomical research program. The nature of the equipment needed for the accomplishment of the program is outlined. Superposition of this program upon a basic long-term lunar-base operations plan tentatively indicates that it could be conducted during the 1970's and 1980's, well within the constraints imposed by the logistics of presently planned spacecraft, boosters, and launching facilities. Although the best available numbers were used, the present study is viewed more as an exposition of a methodology than as the establishment of a conclusive result. (Author)

AD-628 946 See Fld. 5/1

AD-629 043 See Fld. 22/2

AD-629 421 See Fld. 6/18

AD-629 422 See Fld. 6/18

AD-629 473 See Fld. 17/2

AD-629 684 See Fld. 20/13

AD-629 705 See Fld. 8/5

22/2. SPACECRAFT

AD-629 043 Fld. 22/2, 22/1
TORONTO UNIV (ONTARIO)
OPERATING BOUNDARIES FOR STEADY HYPERSONIC FLIGHT ON A MINOR CIRCLE,
by A. M. Drummond. 19 Aug 64, 9p. Contract AF-AFOSR-222-64,
AFOSR 65-2345

Unclassified report

Availability: Published in Canadian Aeronautics and Space Journal v11 n1 p1-8 Jan 1965. Copies to DDC users only.

Descriptors: (*Hypersonic flight, Flight paths), (*Aerospace craft, Trajectories), Aerodynamics, Mathematical analysis, Canada

An analysis is presented of steady flight at constant altitude on minor-circle paths about a spherical, non-rotating earth. Calculations determining the altitude-speed domain available for flight are made and the limitations imposed on the domain by lift, thrust and temperature bounds are shown. The principal conclusion is that minor-circle flight is possible at speeds up to and slightly beyond circular speed at an average altitude of 160,000 ft. The performance is mainly thrust limited, though increased allowable skin temperatures would result in an increase in performance. The highest possible value of the quantity C sub L S/W is desirable to achieve a high operating altitude. (Author)

AD-629 124 Fld. 22/2
CFSTI Prices: HC $5.60 MF $0.50
RAND CORP SANTA MONICA CALIF
THE LONGITUDINAL AND LATERAL RANGE OF HYPERSONIC GLIDE VEHICLES WITH CONSTANT BANK ANGLE,
by S. Y. Chen. Jan 66, 52p. Rept. no. rm-4630-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Reentry vehicles, Hypersonic flight), Aerodynamic characteristics, Trajectories, Flight paths, Mathematical analysis

Approximate closed-form solutions for various flight conditions were obtained to determine both the longitudinal and lateral range of hypersonic glide vehicles with constant bank angle. Results for equilibriumglide vehicles with a constant lift-to-drag (L/D) ratio and small and slowly changing flight-path angle are presented in graphical form. Other approximate closed-form solutions are also obtained for glide reentry at very small flight-path angle, near-constantspeed glide at high altitude, constant-deceleration glide at constant altitude, and constant-deceleration glide at fixed flight-path angle. The assumption of a very small flight-path angle results in a smaller range prediction than does the assumption of a small and slowly changing flight-path angle. This is especially true for prediction of the lateral range of vehicles with high lift-to-drag ratio. For a vehicle with an L/D of 3, entering at 0.98 orbital velocity and decelerating to 0.2 orbital velocity, the assumption of a very small flight-path angle results in predictions that underestimate lateral and longitudinal range by 22.6 and 22.5 percent, respectively, in comparison with the predictions based on the assumption of a small and slowly changing flight-path angle. In other words, completely neglecting the flight-path angle in the equations of motion leads to a conservative range prediction. (Author)

AD-629 583 See Fld. 17/7

AD-629 720 See Fld. 11/9

AD-629 721 See Fld. 4/1

22/3. SPACECRAFT TRAJECTORIES AND REENTRY

AD-629 209 Fld. 22/3
VON KARMAN INST FOR FLUID DYNAMICS RHODE-SAINT-GENESE (BELGIUM)
RECOVERY OF INTERPLANETARY VEHICLES BY LOW-THRUST BRAKING OUTSIDE THE ATMOSPHERE,
by L. Moulin. 20 Nov 64, 11p. Contract AF-EOAR-39-63,
AFOSR 65-2346

Unclassified report

Availability: Published in Astronautica Acta v11 n2 p110-7 1965. Copies to DDC users only.

Descriptors: (*Reentry vehicles, Atmosphere entry), (*Atmosphere entry, Reentry vehicles), Recovery, Astronautics, Descent trajectories, Spacecraft, Deceleration, Electric propulsion

An attempt has been made to optimize the problem of recovering an interplanetary vehicle through the earth's atmosphere. Optimum conditions are defined as those which would minimize the deadweight, which includes the fuel required for rocket braking, and the amount of material which is ablated for heat protection during the flight into the atmosphere. It is shown that when electrical propulsion can be used, an optimum compromise between partial rocket and atmospheric braking may exist, depending upon the respective qualities of the propulsion system and ablative material. (Author)

AD-629 302 Fld. 22/3
UNITED AIRCRAFT CORP EAST HARTFORD CONN
OPTIMUM POWER-LIMITED ORBIT TRANSFER IN STRONG GRAVITY FIELDS.
Revised ed.,
by Theodore N. Edelbaum. 11 Jan 65, 5p. Contract AF 49 (638)-1239,
AFOSR 65-2328

Unclassified report

Revision of manuscript submitted 26 Aug 64.

Availability: Published in AIAA Journal, v3 n5 p921-25 May 1965. Copies to DDC users only.

Descriptors: (*Transfer trajectories, Optimization), (*Astronautics, Transfer trajectories), Space flight, Celestial mechanics, Fuel consumption, Mathematical analysis

Analytic solutions are obtained for optimum transfer between arbitrary coplanar or coaxial ellipses in strong central gravitational fields. Fuel consumption is minimized for fixed transfer times with powerlimited propulsion. The first-order secular solution obtained is valid only if many revolutions are made about the primary body during the transfer. The necessary conditions of Euler, Weierstrass, and Jacobi are satisfied so that the solutions actually furnish a local minimum. Multiple solutions are obtained for large changes in inclination or argument of perigee. The analysis shows which of these solutions furnishes an absolute minimum. It is found that all extremals violate the Jacobi condition and cease to be minimizing solutions if they are followed far enough. (Author)

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field/group. A typical subject index entry is shown below.

*ALUMINUM
GLASS TEXTILES
INVESTIGATION OF GLASS-
METAL COMPOSITE MATERIALS
AD-619 773 FLD. 11/7

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field/group and titles are also listed. Three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*CHASE, JOHN W.
* * *
THE LANTHANUM, EUROPIUM,
AND DYSPROSIUM CONTENTS OF
TWO TEKTITES
AD-619 828 FLD. 8/7
* * *
A PROCEDURE FOR GEOCHEMICAL
INTERPRETATION OF TERRESTRIAL
RARE-EARTH ABUNDANCE PATTERNS
AD-619 834 FLD. 8/7

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry for each document are listed the originator of the report, the originator's report number, the title, AD number, and field/group. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parenthesis directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

*AEROJET- GENERAL CORP AZUSA
CALIF

* * *

TR3015
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
(AFOSR 65-1058)
AD-619 513 FLD. 7/4

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH WASHINGTON D C

* * *

65-1058
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
AD-619 513 FLD. 7/4

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field/group.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 5167
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-65-315)
AD-619 580 FLD. 9/5
(ESD TDR-65-309)
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The Report Number Index lists identifying numbers assigned either by the document originators or by the sponsors of the work described in the documents. The AD number and field/group location in TAB are given for each report number. If both the originator and the sponsor of a document have assigned identifying numbers, listings for both will appear in the respective alphanumeric positions.

In certain cases accession numbers are also given with the corresponding AD numbers and TAB locations; for instance, the IDEP (Interservice Data Exchange Program) reports and the CFSTI-TT reports (Technical Translations from the Clearinghouse for Federal Scientific and Technical Information).

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AD-620 250	FLD. 3/1
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AD-469 558	FLD. 19/1A

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AD-629 309 FLD. 9/7

•AF 19(628)-5167
LINCOLN LAB MASS INST OF TECH LEXINGTON
TN-1966-19
(ESD-TDR-66-34)
AD-628 907 FLD. 9/1
TR-400
(ESD-TDR-65-418)
AD-629 047 FLD. 3/1
(ESD-TDR-65-583)
AD-629 048 FLD. 20/12
TN-1966-9-PT-1
(ESD-TDR-66-11)
AD-629 359 FLD. 17/9
TN-1966-3
(ESD-TDR-66-45)
AD-629 361 FLD. 9/2
TR-384
(ESD-TDR-65-493)
AD-629 429 FLD. 20/12

•AF 19(628)-5719
LOCKHEED-CALIFORNIA CO BURBANK
LR-19398
(AFCRL-66-103)
F AD-629 627 FLD. 3/2

•AF 29(601)-6042
COLORADO SCHOOL OF MINES RESEARCH FOUNDATION INC GOLDEN
(AFWL-TR-65-121-VOL-2)
AD-628 977 FLD. 11/6

•AF 30(602)-3041
SYLVANIA ELECTRONIC SYSTEMS-CENTRAL WILLIAMSVILLE N Y
(RADC-TR-65-361)
AD-629 543 FLD. 9/5

•AF 30(602)-3213
ITEK CORP WALTHAM MASS
(RADC-TR-65-329-VOL-1)

F AD-629 692 FLD. 5/7
(RADC-TR-65-329-VOL-2)
F AD-629 693 FLD. 5/7
(RADC-TR-65-329-VOL-3)
F AD-629 694 FLD. 5/7
(RADC-TR-65-329-VOL-4)
F AD-629 695 FLD. 5/7

•AF 30(602)-3398
AIRBORNE INSTRUMENTS LAB DEER PARK N Y
AIL-2953-1
(RADC-TR-65-442)
F AD-629 601 FLD. 17/9

•AF 30(602)-3388
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
(RADC-TR-65-274)
F AD-629 550 FLD. 17/2

•AF 30(602)-3404
BROWN (D) ASSOCIATES INC EAU GALLIE FLA
(RADC-TR-65-418)
F AD-629 628 FLD. 8/2

•AF 30(602)-3480
RADIO CORP OF AMERICA CAMDEN N J
(RADC-TR-65-337)
F AD-628 886 FLD. 9/3

•AF 30(602)-3587
RADIO CORP OF AMERICA LANCASTER PA ELECTRONIC COMPONENTS AND DEVICES
(RADC-TR-65-478)
F AD-629 162 FLD. 20/3

•AF 30(602)-3590
AUTONETICS ANAHEIM CALIF RESEARCH AND ENGINEERING DIV
(RADC-TR-65-273)
F AD-629 544 FLD. 15/5

•AF 30(602)-3774
HELPAR INC FALLS CHURCH VA
(RADC-TR-65-434)
F AD-629 108 FLD. 20/14

•AF 33(615)-1045
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
ERL-65-32
AD-629 578 FLD. 9/5

•AF 33(615)-1046
CINCINNATI UNIV OHIO
(AMRL-TR-65-203)
F AD-628 944 FLD. 5/9
(AMRL-TR-65-180)
F AD-629 594 FLD. 5/10

•AF 33(615)-1302
BOLT BERANEK AND NEWMAN INC CAMBRIDGE MASS
BBN-1242
(AFFDL-TR-65-92-VOL-1)
AD-629 581 FLD. 16/4

•AF 33(615)-1432
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS AND DEVICES
(AFAL-TR-66-45)
AD-629 246 FLD. 9/1

•AF 33(615)-1909
STANFORD UNIV CALIF INST FOR PLASMA RESEARCH
(ARL-65-276)
AD-629 496 FLD. 20/9

•AF 33(615)-1969
CALIFORNIA UNIV LOS ANGELES DEPT OF ENGINEERING
66-9
AD-628 969 FLD. 6/5

•AF 33(615)-2060
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
(NASA-SP-3025)
AD-629 720 FLD. 11/9

•AF 33(615)-2219
NEW YORK UNIV N Y
NYU-AA-69-6
(ARL-65-253)
AD-629 099 FLD. 20/9

•AF 33(615)-3108
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
AD-629 242 FLD. 17/2

•AF 33(616)-8279
QUEENS LAB INC EDISON N J
(ARL-65-235)
F AD-629 565 FLD. 20/2

•AF 33(616)-8378
INDIANA UNIV MEDICAL CENTER INDIANAPOLIS CARDIOPULMONARY LAB
(AMRL-TR-65-54)
AD-628 945 FLD. 6/19

•AF 33(616)-8483
CINCINNATI UNIV OHIO
(ARL-65-239)
AD-629 499 FLD. 20/9

•AF 33(657)-8872
MIDWEST RESEARCH INST KANSAS CITY MO
(ARL-65-227)
AD-628 888 FLD. 12/1

•AF 33(657)-10755
BOSTON UNIV MASS HYPOTHERMIA LAB
(AMRL-TR-65-201)
F AD-629 548 FLD. 6/19

•AF 33(657)-10944
CINCINNATI UNIV OHIO
(AFML-TR-65-271)
S AD-628 919 FLD. 7/4

•AF 33(657)-11305
AEROJET-GENERAL CORP DAYTON OHIO
(AMRL-TR-65-230)
AD-629 622 FLD. 6/11

•AF 33(657)-12447
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
SEISMIC DATA LAB-136
AD-629 931 FLD. 8/11

•AF 33(657)-15919
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
SEISMIC DATA LAB-139
AD-629 939 FLD. 8/11

•AF 39(638)-1468
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
(AFOSR-66-0231)
AD-629 193 FLD. 19/2

•AF 40(600)-1200
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
AEDC-TR-65-287
AD-629 926 FLD. 13/11

•AF 41(609)-1693
USAF RADIATION LAB UNIV OF CHICAGO ILL
AD-629 311 FLD. 6/18

•AF 41(609)-1769
BRYN MAWR COLL PA DEPT OF BIOLOGY
(AAL-TR-65-12)
F AD-629 003 FLD. 6/20

•AF 41(609)-1918
HAWAII UNIV HONOLULU PACIFIC BIOMEDICAL RESEARCH CENTER
(AAL-TR-65-10)
AD-628 897 FLD. 6/7
(AAL-TR-65-11)
AD-628 898 FLD. 6/7

•AF 41(609)-2918
TEXAS NUCLEAR CORP AUSTIN
(SAM-TR-66-5)
AD-629 723 FLD. 6/18

•AF 41(609)-2617
ALBERT EINSTEIN MEDICAL CENTER PHILADELPHIA PA
F AD-629 067 FLD. 6/19

•AF 41(609)-2977
USAF RADIATION LAB UNIV OF CHICAGO ILL
AD-629 311 FLD. 6/18

•AF 49(638)-1700
RAND CORP SANTA MONICA CALIF
RM-4665-PR
AD-629 129 FLD. 12/2

•AF 49(638)-3
SYRACUSE UNIV N Y DEPT OF CHEMISTRY
(AFOSR-65-2367)
AD-629 388 FLD. 7/4

•AF 49(638)-21
PALOMAR OBSERVATORY PASADENA CALIF
(AFOSR-65-2194)
AD-629 036 FLD. 3/2

•AF 49(638)-253
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
(AFOSR-J-23)
AD-629 373 FLD. 20/11

•AF 49(638)-300
AEROCHEM RESEARCH LABS INC PRINCETON N J
(AFOSR-65-2155)
AD-629 248 FLD. 20/4

•AF 49(638)-313
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
(AFOSR-65-2110)
AD-629 075 FLD. 7/4

•AF 49(638)-361
CASE INST OF TECH CLEVELAND OHIO
(AFOSR-65-2602)
AD-629 256 FLD. 12/1

•AF 49(638)-367
MICHIGAN UNIV ANN ARBOR RESEARCH CENTER FOR GROUP DYNAMICS
(AFOSR-65-2196)
AD-629 039 FLD. 5/10

•AF 49(638)-382
RIAS INC BALTIMORE MD
(AFOSR-65-2322)
AD-629 272 FLD. 12/1

•AF 49(638)-402
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS
AD-629 287 FLD. 20/8

•AF 49(638)-496
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF MECHANICS
(AFOSR-66-0173)
AD-629 977 FLD. 20/4

•AF 49(638)-529
ILLINOIS UNIV URBANA DEPT OF PHYSICS
(AFOSR-66-2157)
AD-629 033 FLD. 20/12

•AF 49(638)-561
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF SPACE SCIENCE LAB
AD-629 343 FLD. 3/2

•AF 49(638)-571
SYRACUSE UNIV N Y
(AFOSR-65-2159)
AD-629 028 FLD. 12/1
SYRACUSE UNIV N Y DEPT OF MATHEMATICS
(AFOSR-65-2158)
AD-629 029 FLD. 12/1

•AF 49(638)-673
TRG INC MELVILLE N Y
(AFOSR-65-2795)
AD-629 158 FLD. 20/9
(AFOSR-65-2808)
AD-629 159 FLD. 20/9
(AFOSR-65-2809)
AD-629 160 FLD. 7/9
(AFOSR-65-2810)
AD-629 161 FLD. 20/9

•AF 49(638)-797
WASHINGTON UNIV SEATTLE DEPT OF CHEMISTRY
(AFOSR-65-2163)
AD-629 380 FLD. 7/4

•AF 49(638)-805
WASHINGTON STATE UNIV PULLMAN
(AFOSR-65-2164)
AD-629 382 FLD. 5/10
(AFOSR-65-2165)
AD-629 383 FLD. 5/10

•AF 49(638)-851
AEROJET-GENERAL CORP AZUSA CALIF
AD-629 026 FLD. 21/8.2

•AF 49(638)-879
NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
NU-GDL-8-2-65
(AFOSR-66-0363)
AD-628 918 FLD. 20/9

•AF 49(638)-946
MARTIN CO BALTIMORE MD
(AFOSR-65-2737)
AD-629 019 FLD. 11/6

•AF 49(638)-1059
STANFORD UNIV CALIF RADIO ASTRONOMY INST
REPRINT-R37
(AFOSR-65-2256)
AD-629 289 FLD. 3/2

•AF 49(638)-1067
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF MECHANICS
TR-12
(AFOSR-66-0127)
AD-629 500 FLD. 11/6

•AF 49(638)-1129
POULTER LABS STANFORD RESEARCH INST MENLO PARK CALIF
(AFOSR-66-0326)
F AD-628 989 FLD. 19/4

•AF 49(638)-1131
ATLANTIC RESEARCH CORP ALEXANDRIA VA
(AFOSR-66-0410)
F AD-628 923 FLD. 7/2

•AF 49(638)-1133
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
UACRL-E910004-12
(AFOSR-66-0407)
F AD-628 911 FLD. 20/9

•AF 49(638)-1138
AEROCHEM RESEARCH LABS INC PRINCETON N J
(AFOSR-65-2269)
AD-629 247 FLD. 20/13

•AF 49(638)-1196
ARECIBO IONOSPHERIC OBSERVATORY PUERTO RICO
(AFOSR-65-2868)
AD-629 334 FLD. 3/3
(AFOSR-65-2268)
AD-629 338 FLD. 3/2
(AFOSR-66-0399)
AD-629 968 FLD. 9/5
CENTER FOR RADIOPHYSICS AND SPACE RESEARCH CORNELL UNIV ITHACA N Y
(AFOSR-65-2812)
AD-629 335 FLD. 3/2
(AFOSR-65-2876)
AD-629 336 FLD. 4/1
(AFOSR-65-2267)
AD-629 337 FLD. 4/1

•AF 49(638)-1161
GIANNINI SCIENTIFIC CORP SANTA ANA CALIF
FR-085-1161
(AFOSR-66-0495)
F AD-629 168 FLD. 21/3

•AF 49(638)-1190
MIDWEST RESEARCH INST KANSAS CITY MO
(AFOSR-66-0411)
F AD-628 889 FLD. 7/4

•AF 49(638)-1201
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
(AFOSR-65-2570)
AD-629 291 FLD. 20/12
(AFOSR-66-0271)
AD-629 298 FLD. 20/12

•AF 49(638)-1206
RIAS INC BALTIMORE MD
(AFOSR-65-2330)
AD-629 271 FLD. 12/2

•AF 49(638)-1207
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y
(AFOSR-65-2331)
AD-629 261 FLD. 19/7
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y RESEARCH DEPT
(AFOSR-65-2095)
AD-629 021 FLD. 12/2

•AF 49(638)-1214
UNITED STATES INDUSTRIAL CHEMICALS CO CINCINNATI OHIO
(AFOSR-65-2362)
AD-629 112 FLD. 7/3
(AFOSR-65-2363)
AD-629 122 FLD. 7/3

•AF 49(638)-1220
RIAS INC BALTIMORE MD
(AROD-9084-5)
AD-629 397 FLD. 7/4

•AF 49(638)-1239
UNITED AIRCRAFT CORP EAST HARTFORD CONN
(AFOSR-65-2328)
AD-629 302 FLD. 22/3

•AF 49(638)-1242
RIAS INC BALTIMORE MD
(AFOSR-65-2321)
AD-629 269 FLD. 12/1
(AFOSR-65-2323)
AD-629 270 FLD. 12/1

•AF 49(638)-1267
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
AEROSPACE/MECHANICAL SCI-752
(AFOSR-66-0409)
F AD-628 931 FLD. 21/2

•AF 49(638)-1273
CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING
(AFOSR-66-0302)
AD-629 249 FLD. 7/4
(AFOSR-66-0340)
AD-629 250 FLD. 7/4
(AFOSR-66-0341)
AD-629 251 FLD. 7/4
(AFOSR-65-2369)
AD-629 252 FLD. 7/4
(AFOSR-65-2368)
AD-629 253 FLD. 7/4

•AF 49(638)-1276
STANFORD UNIV CALIF DEPT OF AERONAUTICS AND ASTRONAUTICS
SUDAER-240
(AFOSR-66-0089)
AD-628 925 FLD. 20/11
SUDAER-239
(AFOSR-66-0009)
AD-629 579 FLD. 20/11
SUDAER-226
(AFOSR-65-1875)
AD-629 580 FLD. 20/11

•AF 49(638)-1282
TUFTS UNIV MEDFORD MASS INST FOR PSYCHOLOGICAL RESEARCH
(AFOSR-65-2679)
AD-629 300 FLD. 5/10

•AF 49(638)-1283
GENERAL ELECTRIC CO PHILADELPHIA PA MISSILE AND SPACE DIV
214-M53
(AFOSR-66-0365)
F AD-628 924 FLD. 20/9

•AF 49(638)-1301
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF CHEMISTRY
(AFOSR-65-0304)
AD-629 378 FLD. 7/5

•AF 49(638)-1322
PALOMAR OBSERVATORY PASADENA CALIF
(AFOSR-65-2773)
AD-629 376 FLD. 3/2

•AF 49(638)-1341
STANFORD UNIV CALIF DEPT OF CHEMISTRY
(AFOSR-66-0316)
AD-629 281 FLD. 11/9
(AFOSR-65-2376)
AD-629 282 FLD. 6/1

•AF 49(638)-1387
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF SPACE SCIENCE LAB
(AFOSR-65-2987)
AD-629 260 FLD. 20/9

•AF 49(638)-1373
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
(AFOSR-65-2336)
AD-629 172 FLD. 9/1

•AF 49(638)-1375
STANFORD UNIV CALIF RADIO ASTRONOMY INST
R36
(AFOSR-65-2992)
AD-629 366 FLD. 3/2

•AF 49(638)-1377
NORTHWESTERN UNIV EVANSTON ILL DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2347)
AD-629 267 FLD. 20/12

•AF 49(638)-1379
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
(AFOSR-65-2582)
AD-629 292 FLD. 20/12
(AFOSR-65-2581)
AD-629 293 FLD. 20/12

•AF 49(638)-1388
INSTITUTE OF GEOPHYSICS AND PLANETARY PHYSICS UNIV OF CALIFORNIA SAN DIEGO

AD-629 966 FLD. 8/11

•AF 49(638)-1389
INSTITUTE OF THEORETICAL PHYSICS STANFORD UNIV CALIF
(AFOSR-65-2097)
AD-629 020 FLD. 20/8
STANFORD UNIV CALIF DEPT OF PHYSICS
(AFOSR-65-2786)
AD-629 283 FLD. 20/8

•AF 49(638)-1427
HERNER AND CO WASHINGTON D C
(AFOSR-65-2289)
AD-629 367 FLD. 5/2

•AF 49(638)-1492
WESTINGHOUSE ELECTRIC CORP BALTIMORE MD
(AFOSR-65-2685)
AD-629 371 FLD. 9/2

•AF 49(638)-1498
MARTIN CO BALTIMORE MD
(AFOSR-65-2737)
AD-629 019 FLD. 11/6

•AF 49(638)-1956
DAVID SARNOFF RESEARCH CENTER PRINCETON N J
(AFOSR-66-0494)
F AD-628 933 FLD. 8/11

•AF 49(638)-1968
NATIONAL MAGNET LAB MASS INST OF TECH CAMBRIDGE
(AFOSR-66-0083)
AD-629 182 FLD. 20/3
(AFOSR-65-2578)
AD-629 183 FLD. 20/8
(AFOSR-66-0270)
AD-629 184 FLD. 20/12
(AFOSR-66-0228)
AD-629 185 FLD. 20/3
(AFOSR-65-2585)
AD-629 186 FLD. 20/13
(AFOSR-65-2932)
AD-629 187 FLD. 20/12
(AFOSR-66-0277)
AD-629 188 FLD. 20/12
(AFOSR-66-0224)
AD-629 189 FLD. 9/1
(AFOSR-66-0227)
AD-629 190 FLD. 20/3
(AFOSR-65-2575)
AD-629 192 FLD. 20/4
(AFOSR-66-0236)
AD-629 194 FLD. 20/3
(AFOSR-66-0223)
AD-629 195 FLD. 20/12

•AF 49(638)-1991
VIDYA DIV ITEK CORP PALO ALTO CALIF
VIDYA-213
(AFOSR-66-0412)
F AD-629 312 FLD. 20/4

•AF 49(638)-1997
JOHNS HOPKINS UNIV BALTIMORE MD
(AFOSR-65-2875)
AD-629 333 FLD. 7/4

•AF 49(638)-1900
SOCONY MOBIL OIL CO INC PRINCETON N J CENTRAL RESEARCH DIV LAB
1
(AFOSR-66-0285)
AD-628 890 FLD. 20/4

•AF 49(638)-1912
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y RESEARCH DEPT
(AFOSR-65-2094)
AD-629 339 FLD. 9/5

•AF 49(638)-1917
STANFORD UNIV CALIF DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2356)
AD-629 369 FLD. 9/4

•AF 49(638)-1700
RAND CORP SANTA MONICA CALIF
RM-4854-PR
AD-629 082 FLD. 14/1
RM-4630-PR
AD-629 124 FLD. 22/2
RM-4852-PR
AD-629 131 FLD. 15/5
RM-4928-PR
AD-629 132 FLD. 12/1
RM-4640-PR
AD-629 133 FLD. 5/3
RM-4931-PR
AD-629 169 FLD. 20/13
RM-4916-PR
AD-629 429 FLD. 22/1
RM-4924-PR
AD-629 556 FLD. 4/1
RM-4907-PR
AD-629 570 FLD. 11/2
RM-4889-PR
AD-629 605 FLD. 12/1
RM-4540-PR
AD-629 606 FLD. 5/2

•AF 61(052)-21
KAROLINSKA INSTITUTET STOCKHOLM (SWEDEN) DEPT OF PHYSIOLOGY
(AFOSR-65-1571)
AD-629 561 FLD. 6/16

•AF 61(052)-23
MILAN UNIV (ITALY) ISTITUTO DI FISIOLOGIA UMANA
(AFOSR-TN-60-1295)
AD-629 109 FLD. 6/16
(AFOSR-3389)
AD-629 110 FLD. 6/19
(AFOSR-3453)
AD-629 111 FLD. 6/19

•AF 61(052)-121
ISRAEL INST OF APPLIED SOCIAL RESEARCH JERUSALEM
(AFOSR-65-2674)
AD-629 269 FLD. 5/10

•AF 61(052)-218
INSTITUTE FOR ORGANIC CHEMISTRY TNO UTRECHT (NETHERLANDS)
(AFML-TR-65-192)
S AD-629 554 FLD. 7/3

•AF 61(052)-253
SIENA UNIV (ITALY) ISTITUTO DI PATOLOGIA MEDICA
(AFOSR-65-2744)
AD-629 279 FLD. 6/16
(AFOSR-65-2241)
AD-629 280 FLD. 6/16

•AF 61(052)-356
BRUSSELS UNIV (BELGIUM) LABORATOIRE DE MORPHOLOGIE ANIMALE
(AFOSR-65-2245)
AD-629 459 FLD. 6/3
(AFOSR-65-2244)
AD-629 461 FLD. 6/3
(AFOSR-65-2243)
AD-629 462 FLD. 6/3

•AF 61(052)-398
JOHANNES GUTENBERG UNIVERSITAET MAINZ (WEST GERMANY)
(AFCRL-SR-33)
AD-629 123 FLD. 4/1
(AFCRL-SR-33)
AD-629 127 FLD. 4/1

•AF 61(052)-647
CAMBRIDGE LANGUAGE RESEARCH UNIT (ENGLAND)
(AFOSR-65-2247)
AD-629 284 FLD. 5/7

•AF 61(052)-675
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
(AFOSR-66-0405)
AD-628 917 FLD. 20/9

(AFOSR-65-2250)
AD-629 262 FLD. 20/9

•AF 61(052)-701
UPPSALA UNIV (SWEDEN) QUANTUM CHEMISTRY GROUP SCIENTIFIC-41
(ARL-66-0034)
AD-629 091 FLD. 20/10

•AF 61(052)-757
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE
(ARL-66-0036)
AD-629 201 FLD. 20/8

•AF-AFOSR-28-63
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF CHEMISTRY
(AFOSR-66-0045)
AD-629 614 FLD. 7/4

•AF-AFOSR-56-65
UTAH UNIV SALT LAKE CITY INST OF METALS AND EXPLOSIVES RESEARCH
(AFOSR-65-1918)
AD-629 231 FLD. 19/4
(AFOSR-65-2209)
AD-629 238 FLD. 19/4
(AFOSR-65-2653)
AD-629 239 FLD. 19/4

•AF-AFOSR-61-38
JOHNS HOPKINS UNIV BALTIMORE MD SCHOOL OF MEDICINE
(AFOSR-65-2743)
AD-629 560 FLD. 6/16

•AF-AFOSR-61-58
UNIVERSIDAD CATOLICA DE CHILE SANTIAGO LABORATORIO DE FISIOLOGIA
(AFOSR-65-2845)
AD-629 559 FLD. 6/16

•AF-AFOSR-61-63
MELLON INST PITTSBURGH PA
(AFOSR-65-2867)
AD-629 613 FLD. 7/4

•AF-AFOSR-62-13
FLORIDA UNIV GAINESVILLE
(AFOSR-65-2682)
AD-629 171 FLD. 6/16
(AFOSR-65-2680)
AD-629 563 FLD. 6/15

•AF-AFOSR-62-17
KANSAS STATE UNIV MANHATTAN
(AFOSR-65-2659)
AD-629 566 FLD. 9/10

•AF-AFOSR-62-19
MISSISSIPPI UNIV UNIVERSITY
(AFOSR-65-2373)
AD-629 551 FLD. 7/2
(AFOSR-65-2374)
AD-629 552 FLD. 7/2
(AFOSR-65-2372)
AD-629 553 FLD. 7/3

•AF-AFOSR-62-20
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
(AFOSR-65-2609)
AD-629 143 FLD. 12/1

•AF-AFOSR-62-46
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-65-2931)
AD-629 149 FLD. 7/4

•AF-AFOSR-62-52
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY
(AFOSR-66-0305)
AD-629 549 FLD. 7/3

•AF-AFOSR-62-79
COLORADO UNIV BOULDER DEPT OF

CHEMISTRY
(AFOSR-65-2375)
AD-629 547 FLD. 7/3

•AF-AFOSR-62-95
DELAWARE UNIV NEWARK CENTER FOR RESEARCH ON SOCIAL BEHAVIOR
(AFOSR-65-2661)
AD-629 147 FLD. 5/10

•AF-AFOSR-62-108
NEW YORK UNIV N Y
(AFOSR-65-2735)
AD-629 085 FLD. 12/1

•AF-AFOSR-62-159
ARKANSAS UNIV FAYETTEVILLE DEPT OF PHYSICS
(AFOSR-65-2776)
AD-629 540 FLD. 20/10
(AFOSR-65-2775)
AD-629 541 FLD. 20/10

•AF-AFOSR-62-189
MIAMI UNIV CORAL GABLES FLA
(AFOSR-65-2355)
AD-629 626 FLD. 12/1

•AF-AFOSR-62-197
PRINCETON UNIV N J DEPT OF PSYCHOLOGY
(AFOSR-65-2662)
AD-629 144 FLD. 5/10
(AFOSR-65-2660)
AD-629 146 FLD. 5/10

•AF-AFOSR-62-198
HARVARD UNIV CAMBRIDGE MASS
(AFOSR-J27)
AD-629 538 FLD. 12/1

•AF-AFOSR-62-237
TEXAS UNIV AUSTIN DEPT OF CHEMICAL ENGINEERING
(AFOSR-66-0272)
AD-629 173 FLD. 20/12

•AF-AFOSR-62-242
STANFORD UNIV CALIF DIV OF ENGINEERING MECHANICS
(AFOSR-65-2332)
AD-629 666 FLD. 20/4

•AF-AFOSR-62-261
BRITISH COLUMBIA UNIV VANCOUVER
(AFOSR-65-2605)
AD-629 567 FLD. 12/1
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF MATHEMATICS
(AFOSR-65-2607)
AD-629 134 FLD. 12/1
(AFOSR-65-2606)
AD-629 135 FLD. 12/1

•AF-AFOSR-62-266
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
(AFOSR-65-2335)
AD-629 152 FLD. 20/4
(AFOSR-65-2334)
AD-629 536 FLD. 20/13

•AF-AFOSR-62-278
MINNESOTA UNIV MINNEAPOLIS DEPT OF AERONAUTICS AND ENGINEERING MECHANICS
(AFOSR-65-2342)
AD-629 568 FLD. 20/11

•AF-AFOSR-62-280
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
(AFOSR-65-2336)
AD-629 172 FLD. 9/1

•AF-AFOSR-62-298
WASHINGTON UNIV SEATTLE
(AFOSR-66-0401)
AD-629 533 FLD. 20/4

•AF-AFOSR-62-303
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
(AFOSR-65-2891)
AD-629 532 FLD. 8/11

•AF-AFOSR-62-317
MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INSULATION RESEARCH
(AFOSR-65-2774)
AD-629 266 FLD. 20/12

•AF-AFOSR-62-319
IOWA ENGINEERING EXPERIMENT STATION AMES
(AFOSR-65-2779)
AD-629 531 FLD. 7/4

•AF-AFOSR-62-333
BUENOS AIRES UNIV (ARGENTINA) INSTITUTO DE ANATOMIA GENERAL Y EMBRIOLOGIA
(AFOSR-65-2745)
AD-629 093 FLD. 6/17
(AFOSR-65-2746)
AD-629 094 FLD. 6/19

•AF-AFOSR-62-391
COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATION SYDNEY (AUSTRALIA) DIV OF PHYSICS
(AFOSR-65-2590)
AD-629 558 FLD. 20/12

•AF-AFOSR-62-398
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA) DEPT OF NUCLEAR AND RADIATION CHEMISTRY
(AFOSR-65-2826)
AD-629 086 FLD. 7/5

•AF-AFOSR-62-400
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA)
(AFOSR-65-2950)
AD-629 529 FLD. 12/1

•AF-AFOSR-62-402
SYDNEY UNIV (AUSTRALIA)
(AFOSR-65-2351)
AD-629 530 FLD. 12/1

•AF-AFOSR-71-63
GUGGENHEIM JET PROPULSION CENTER CALIF INST OF TECH PASADENA
(AFOSR-65-2488)
AD-629 612 FLD. 7/4

•AF-AFOSR-124-63
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
(AFOSR-65-2377)
AD-629 638 FLD. 7/3
(AFOSR-65-2380)
AD-629 639 FLD. 7/3
(AFOSR-65-2379)
AD-629 640 FLD. 7/3
(AFOSR-66-0024)
AD-629 641 FLD. 7/3

•AF-AFOSR-139-64
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB ERL-65-32
AD-629 578 FLD. 9/5

•AF-AFOSR-145-63
KANSAS STATE UNIV MANHATTAN DEPT OF CHEMISTRY
(AFOSR-66-0317)
AD-629 683 FLD. 7/3

•AF-AFOSR-148-63
CHICAGO UNIV ILL INST FOR THE STUDY OF METALS
F AD-629 495 FLD. 20/12

•AF-AFOSR-171-63
CALIFORNIA UNIV BERKELEY DEPT OF ASTRONOMY
(AFOSR-66-0383)
AD-629 682 FLD. 3/2

•AF-AFOSR-180-63
CLEMSON UNIV S C
(AFOSR-66-0222)
AD-629 701 FLD. 20/2

•AF-AFOSR-181-63
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF CHEMISTRY
(AFOSR-65-2366)
AD-629 691 FLD. 7/4
(AFOSR-65-2365)
AD-629 692 FLD. 7/4

•AF-AFOSR-182-63
RENSSELAER POLYTECHNIC INST TROY N Y
(AFOSR-65-2201)
AD-629 649 FLD. 12/1

•AF-AFOSR-183-63
YALE UNIV NEW HAVEN CONN DEPT OF CHEMISTRY
(AFOSR-66-0098)
AD-629 681 FLD. 7/3

•AF-AFOSR-196-63
PITTSBURGH UNIV PA DEPT OF PHYSICS
(AFOSR-66-0233)
AD-629 694 FLD. 20/12
(AFOSR-65-2101)
AD-629 695 FLD. 20/10
(AFOSR-66-0234)
AD-629 696 FLD. 7/4
(AFOSR-66-0230)
AD-629 697 FLD. 20/12

•AF-AFOSR-200-63
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
(AFOSR-66-0240)
AD-629 658 FLD. 20/12
(AFOSR-66-0237)
AD-629 659 FLD. 20/12
(AFOSR-66-0241)
AD-629 660 FLD. 20/12
(AFOSR-66-0239)
AD-629 661 FLD. 20/12

•AF-AFOSR-202-63
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
1
(AFOSR-66-0408)
F AD-628 930 FLD. 20/9

•AF-AFOSR-207-63
PURDUE UNIV LAFAYETTE IND SCHOOL OF MECHANICAL ENGINEERING
AD-629 070 FLD. 21/9.2

•AF-AFOSR-208-63
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH LAB
(AFOSR-66-0232)
AD-629 699 FLD. 11/2

•AF-AFOSR-213-63
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
(AFOSR-66-0229)
AD-629 676 FLD. 20/8

•AF-AFOSR-222-64
TORONTO UNIV (ONTARIO)
(AFOSR-65-2345)
AD-629 043 FLD. 22/2

•AF-AFOSR-228-63
COLUMBIA UNIV NEW YORK DEPT OF MECHANICAL ENGINEERING
(AFOSR-65-2976)
AD-629 668 FLD. 20/2

•AF-AFOSR-239-63
STANFORD UNIV CALIF DIV OF ENGINEERING MECHANICS
(AFOSR-65-2332)

AD-629 666 FLD. 20/4

*AF-AFOSR-240-63
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY
(AFOSR-65-2361)
AD-629 698 FLD. 20/2

*AF-AFOSR-246-63
CALIFORNIA UNIV LOS ANGELES SCHOOL OF MEDICINE
(AFOSR-65-2891)
AD-629 177 FLD. 6/5

*AF-AFOSR-249-64
YALE UNIV NEW HAVEN CONN DEPT OF PHYSICS
(AFOSR-65-1990)
AD-629 072 FLD. 7/4

*AF-AFOSR-256-63
WASHINGTON STATE UNIV PULLMAN
(AFOSR-65-2669)
AD-629 697 FLD. 5/10

*AF-AFOSR-269-63
CANTERBURY UNIV CHRISTCHURCH (NEW ZEALAND) DEPT OF CHEMISTRY
(AFOSR-65-2383)
AD-629 665 FLD. 7/4

*AF-AFOSR-270-63
NORTHWESTERN UNIV EVANSTON ILL INFORMATION-PROCESSING AND CONTROL SYSTEMS LAB
(AFOSR-65-2348)
AD-629 669 FLD. 9/3

*AF-AFOSR-284-63
NEW YORK UNIV N Y DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2430)
AD-629 691 FLD. 9/3

*AF-AFOSR-288-63
ALABAMA UNIV UNIVERSITY DEPT OF PHYSICS
(AFOSR-65-2591)
AD-629 663 FLD. 7/4

*AF-AFOSR-329-63
NORTHWESTERN UNIV EVANSTON ILL GAS DYNAMICS LAB
NU-GDL-8-2-65
(AFOSR-66-0363)
AD-628 918 FLD. 20/9

*AF-AFOSR-337-63
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
(AFOSR-65-2788)
AD-629 686 FLD. 9/5

*AF-AFOSR-349-63
PITTSBURGH UNIV PA DEPT OF CHEMISTRY
(AFOSR-66-0318)
AD-629 711 FLD. 7/3

*AF-AFOSR-352-63
CALIFORNIA INST OF TECH PASADENA
(AFOSR-65-2473)
AD-629 625 FLD. 20/4

*AF-AFOSR-357-63
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
(AFOSR-65-2691)
AD-629 611 FLD. 12/1

*AF-AFOSR-358-63
MIAMI UNIV CORAL GABLES FLA
(AFOSR-65-2395)
AD-629 626 FLD. 12/1

*AF-AFOSR-361-63
WINDSOR UNIV (ONTARIO) DEPT OF PHYSICS
(AFOSR-65-2819)
AD-629 065 FLD. 7/5

*AF-AFOSR-373-63
MICHIGAN UNIV ANN ARBOR DEPT OF MATHEMATICS
(AFOSR-65-2637)
AD-629 604 FLD. 12/1

*AF-AFOSR-381-63
MINNESOTA UNIV MINNEAPOLIS DEPT OF MATHEMATICS
(AFOSR-65-2619)
AD-629 600 FLD. 12/1
(AFOSR-65-2618)
AD-629 602 FLD. 12/1

*AF-AFOSR-407-63
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
(AFOSR-65-2611)
AD-629 083 FLD. 12/1
(AFOSR-65-2609)
AD-629 143 FLD. 12/1
(AFOSR-65-2610)
AD-629 617 FLD. 12/1
(AFOSR-65-2612)
AD-629 618 FLD. 12/1
(AFOSR-65-2613)
AD-629 619 FLD. 12/1
(AFOSR-65-2614)
AD-629 621 FLD. 12/1

*AF-AFOSR-408-63
WESTERN RESERVE UNIV CLEVELAND OHIO DEPT OF PHYSIOLOGY
(AFOSR-65-2853)
AD-629 599 FLD. 6/16

*AF-AFOSR-432-63
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
(AFOSR-65-2391)
AD-629 597 FLD. 12/1

*AF-AFOSR-438-63
IOWA STATE UNIV IOWA CITY
(AFOSR-65-2629)
AD-629 595 FLD. 12/1

*AF-AFOSR-448-63
CATHOLIC UNIV OF AMERICA WASHINGTON D C
(AFOSR-65-2866)
AD-629 080 FLD. 20/3
(AFOSR-65-2780)
AD-629 616 FLD. 20/10
CATHOLIC UNIV OF AMERICA WASHINGTON D C DEPT OF PHYSICS
(AFOSR-65-2805)
AD-629 615 FLD. 20/12

*AF-AFOSR-448-63
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
AMS-766
(AFOSR-66-0578)
F AD-629 589 FLD. 21/9.2

*AF-AFOSR-490-64
NORTH CAROLINA UNIV CHAPEL HILL DEPT OF PHYSICS
(AFOSR-65-2112)
AD-629 058 FLD. 20/12

*AF-AFOSR-460-63
ILLINOIS UNIV URBANA
(AFOSR-65-2600)
AD-629 591 FLD. 12/1
ILLINOIS UNIV URBANA DEPT OF MATHEMATICS
(AFOSR-65-2601)
AD-629 593 FLD. 12/1

*AF-AFOSR-492-64
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS
(AFOSR-65-2115)
AD-629 031 FLD. 4/1

*AF-AFOSR-496-64
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2117)
AD-629 062 FLD. 20/3

*AF-AFOSR-500-64
MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-65-2140)
AD-629 041 FLD. 20/10

*AF-AFOSR-503-64
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF CHEMISTRY
(AFOSR-65-2143)
AD-629 049 FLD. 7/3
(AFOSR-65-2142)
AD-629 050 FLD. 7/3
(AFOSR-65-2141)
AD-629 052 FLD. 7/3
(AFOSR-65-2144)
AD-629 063 FLD. 7/3

*AF-AFOSR-520-64
CHICAGO UNIV ILL DEPT OF MATHEMATICS
(AFOSR-65-2119)
AD-629 032 FLD. 12/1

*AF-AFOSR-523-64
CALIFORNIA UNIV RIVERSIDE DEPT OF PHYSICS
(AFOSR-65-2574)
AD-629 190 FLD. 20/12
(AFOSR-65-2593)
AD-629 191 FLD. 20/12

*AF-AFOSR-542-64
STATE UNIV OF NEW YORK STONY BROOK DEPT OF ELECTRICAL ENGINEERING
(AFOSR-65-2145)
AD-629 057 FLD. 9/3

*AF-AFOSR-583-64
CALIFORNIA UNIV BERKELEY
(AFOSR-65-2146)
AD-629 051 FLD. 12/1

*AF-AFOSR-567-64
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
(AFOSR-65-2147)
AD-629 025 FLD. 20/7

*AF-AFOSR-602-64
INDIANA UNIV BLOOMINGTON DEPT OF CHEMISTRY
(AFOSR-65-2148)
AD-629 022 FLD. 7/4
(AFOSR-65-2149)
AD-629 023 FLD. 12/1
(AFOSR-65-2124)
AD-629 024 FLD. 7/4

*AF-AFOSR-610-64
CALIFORNIA UNIV SAN DIEGO DEPT OF PHYSICS
(AFOSR-66-0276)
AD-629 175 FLD. 20/1
(AFOSR-66-0274)
AD-629 176 FLD. 12/1

*AF-AFOSR-610-65
CALIFORNIA UNIV LA JOLLA
(AFOSR-66-0275)
AD-629 174 FLD. 20/12

*AF-AFOSR-611-64
ROCHESTER UNIV N Y DEPT OF PHYSICS AND ASTRONOMY
(AFOSR-66-0238)
AD-629 030 FLD. 20/6

*AF-AFOSR-631-64
CALIFORNIA UNIV LA JOLLA
(AFOSR-65-2125)
AD-629 089 FLD. 20/12
(AFOSR-65-2151)
AD-629 090 FLD. 20/12

*AF-AFOSR-677-64
XAVIER UNIV CINCINNATI OHIO

SEISMOLOGICAL OBSERVATORY
(AFOSR-65-2905)
AD-629 073 FLD. 8/11

*AF-AFOSR-689-69
POMONA COLL CLAREMONT CALIF DEPT OF PHYSICS
(AFOSR-65-2150)
AD-629 074 FLD. 8/7

*AF-AFOSR-693-69
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
(AROD-5145:3)
AD-629 946 FLD. 12/1

*AF-AFOSR-698-65
CALIFORNIA UNIV SANTA BARBARA DEPT OF MATHEMATICS
(AFOSR-65-2067)
AD-629 035 FLD. 12/1

*AF-AFOSR-726-65
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSICS
(AFOSR-65-2548)
AD-629 069 FLD. 20/12

*AF-EOAR-2-63
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
(AFOSR-65-2509)
AD-629 296 FLD. 6/3
(AFOSR-65-2513)
AD-629 297 FLD. 6/3

*AF-EOAR-9-64
MILAN UNIV (ITALY) ISTITUTO DI CHIMICA GENERALE
(AFOSR-65-2396)
AD-629 303 FLD. 7/4

*AF-EOAR-12-64
OXFORD UNIV (ENGLAND) DEPT OF PHARMACOLOGY
(AFOSR-65-2857)
AD-629 258 FLD. 6/1
(AFOSR-65-2856)
AD-629 259 FLD. 6/1

*AF-EOAR-13-63
CENTRE D'ETUDES DE PHYSIOLOGIE NERVEUSE ET D'ELECTROPHYSIOLOGIE PARIS (FRANCE)
(AFOSR-65-2852)
AD-629 092 FLD. 6/16
(AFOSR-65-2832)
AD-629 093 FLD. 6/16

*AF-EOAR-19-64
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)
(AFOSR-65-2898)
AD-629 288 FLD. 6/1

*AF-EOAR-21-65
KING'S COLL UNIV OF LONDON (ENGLAND)
(ARL-66-0033-VOL-2)
AD-628 885 FLD. 20/10
(ARL-66-0032)
F AD-629 097 FLD. 20/10
F AD-629 098 FLD. 3/2

*AF-EOAR-23-64
HEBREW UNIV JERUSALEM (ISRAEL)
(AFOSR-65-2665)
AD-629 234 FLD. 9/11
UNIVERSITY COLL OF WALES ABERYSTWYTH
(AFOSR-65-2670)
AD-629 235 FLD. 9/11

*AF-EOAR-24-64
HEBREW UNIV JERUSALEM (ISRAEL)
DEPT OF PHYSICS
(AFOSR-65-2962)
AD-629 236 FLD. 20/8

*AF-EOAR-24-65
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
(AFOSR-66-0406)
AD-628 915 FLD. 19/4

*AF-EOAR-28-63
GOTEBORG UNIV (SWEDEN) DEPT OF HISTOLOGY
TR-1
(AFOSR-66-0364)
AD-628 899 FLD. 6/16

*AF-EOAR-30-64
GOTEBORG UNIV (SWEDEN) DEPT OF PHARMACOLOGY
(AFOSR-65-2521)
AD-629 221 FLD. 6/16

*AF-EOAR-31-63
HULL UNIV (ENGLAND) DEPT OF CHEMISTRY
(AFOSR-65-2486)
AD-629 245 FLD. 7/4

*AF-EOAR-32-64
OSLO UNIV (NORWAY) INST FOR THEORETICAL PHYSICS
(AFOSR-66-0362)
F AD-628 922 FLD. 20/10

*AF-EOAR-39-63
VON KARMAN INST FOR FLUID DYNAMICS RHODE-SAINT-GENESE (BELGIUM)
(AFOSR-65-2396)
AD-629 209 FLD. 22/3

*AF-EOAR-42-63
LOUVAIN UNIV (BELGIUM)
(AFOSR-65-2167)
AD-629 027 FLD. 7/4

*AF-EOAR-42-64
UNIVERSITY COLL LONDON (ENGLAND) DEPT OF ANATOMY
(AFOSR-65-2926)
AD-629 299 FLD. 6/3

*AF-EOAR-43-64
BRUSSELS UNIV (BELGIUM) LAB OF PATHOPHYSIOLOGY OF THE NERVOUS SYSTEM
(AFOSR-65-2527)
AD-629 099 FLD. 6/3

*AF-EOAR-43-65
DUBLIN UNIV (EIRE) SCHOOL OF ENGINEERING
AD-628 920 FLD. 21/2

*AF-EOAR-51-63
BRUSSELS UNIV (BELGIUM)
(AFOSR-65-2951)
AD-629 237 FLD. 7/4
(AFOSR-65-2820)
AD-629 240 FLD. 20/3
(AFOSR-65-2169)
AD-629 304 FLD. 7/4

*AF-EOAR-52-64
LIEGE UNIV (BELGIUM)
(AFOSR-66-0393)
AD-629 690 FLD. 20/4

*AF-EOAR-58-63
TECHNION - ISRAEL INST OF TECH HAIFA
(AFOSR-65-2168)
AD-629 040 FLD. 20/11

*AF-EOAR-59-63
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL) DEPT OF BIOPHYSICS
(AFOSR-65-2172)
AD-629 294 FLD. 6/1

*AF-EOAR-61-64
TRINITY COLL DUBLIN (EIRE) SCHOOL OF MATHEMATICS
(AFOSR-65-2869)
AD-629 305 FLD. 20/8

*AF-EOAR-61-68
LIEGE UNIV (BELGIUM)
(AFOSR-66-0393)
AD-629 690 FLD. 20/4

*AF-EOAR-62-9
PISA UNIV (ITALY) ISTITUTO DI FISIOLOGIA
(AFOSR-65-2847)
AD-629 204 FLD. 6/16
(AFOSR-2849)
AD-629 205 FLD. 6/16
(AFOSR-65-2850)
AD-629 206 FLD. 6/16
(AFOSR-65-2848)
AD-629 207 FLD. 6/16

*AF-EOAR-62-67
LYON UNIV (FRANCE)
(AFOSR-65-2671)
AD-629 203 FLD. 6/16
(AFOSR-65-2673)
AD-629 216 FLD. 6/15
LYON UNIV (FRANCE) DEPT OF EXPERIMENTAL MEDICINE
(AFOSR-65-2672)
AD-629 218 FLD. 6/16
LYON UNIV (FRANCE) LABORATOIRE DE PATHOLOGIE EXPERIMENTALE
(AFOSR-65-2683)
AD-629 202 FLD. 6/16

*AF-EOAR-63-64
HEBREW UNIV JERUSALEM (ISRAEL)
DEPT OF PHYSICS
(AFOSR-65-2965)
AD-629 232 FLD. 7/4

*AF-EOAR-63-65
FREIE UNIVERSITAET BERLIN (WEST GERMANY) PHYSIOLOGISCHES INSTITUT
(AFOSR-65-2842)
AD-629 211 FLD. 6/16

*AF-EOAR-64-65
MANCHESTER UNIV (ENGLAND) DEPT OF MECHANICS OF FLUIDS
(AFOSR-65-2475)
AD-629 301 FLD. 20/4

*AF-EOAR-65-63
FREIE UNIVERSITAET BERLIN (WEST GERMANY) PHYSIOLOGISCHES INSTITUT
(AFOSR-65-2843)
AD-629 210 FLD. 6/16

*AF-EOAR-70-64
HEBREW UNIV JERUSALEM (ISRAEL)
DEPT OF PHYSICS
(AFOSR-65-2596)
AD-629 233 FLD. 3/2

*AF-EOAR-71-63
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF PHYSICS
(AFOSR-66-0279)
AD-629 255 FLD. 7/4

*AF-EOAR-76-63
DUBLIN UNIV (EIRE) SCHOOL OF ENGINEERING
(AFOSR-65-2049)
AD-629 243 FLD. 20/4

*AF-EOAR-79-63
CAMBRIDGE UNIV (ENGLAND) DEPT OF APPLIED MATHEMATICS AND THEORETICAL PHYSICS
(AFOSR-65-2784)
AD-629 244 FLD. 20/8

*AF-EOAR-80-64
LEICESTER UNIV (ENGLAND) DEPT OF CHEMISTRY
(AFOSR-66-0303)
AD-629 208 FLD. 7/4

*AF-EOAR-87-63
WEIZMANN INST OF SCIENCE REHOVOTH (ISRAEL)

(AFOSR-66-0063)
AD-629 295 FLD. 7/3

•AF-EOAR-98-63
POLITECNICO DI TORINO (ITALY) ISTITUTO DI MECCANICA APPLICATA TN-32
(AFOSR-65-2736)
AD-629 212 FLD. 20/4

•AFOSR-62-459
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
(AFOSR-65-2352)
AD-629 528 FLD. 12/1

•ARPA ORDER-53-62
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
AD-629 910 FLD. 9/5

•ARPA ORDER-183
CENTRAL RADIO PROPAGATION LAB BOULDER COLO
AD-629 331 FLD. 20/14
AD-629 332 FLD. 4/1
NATIONAL BUREAU OF STANDARDS BOULDER COLO
AD-629 365 FLD. 18/3

•ARPA ORDER-292
DAVID SARNOFF RESEARCH CENTER PRINCETON N J
(AFOSR-66-0994)
F AD-628 933 FLD. 8/11

•ARPA ORDER-306
LEXINGTON LABS INC CAMBRIDGE MASS
AD-629 194 FLD. 20/2

•ARPA ORDER-317-62
PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES
AMS-766
(AFOSR-66-0978)
F AD-629 585 FLD. 21/9.2

•ARPA ORDER-371
STANFORD RESEARCH INST MENLO PARK CALIF
STR-17
AD-629 155 FLD. 9/5

•ARPA ORDER-424
AGRICULTURAL RESEARCH SERVICE WASHINGTON D C
CR-49-65
AD-629 181 FLD. 2/6

•ARPA ORDER-498
LINCOLN LAB MASS INST OF TECH LEXINGTON
TR-389
(ESD-TDR-65-493)
AD-629 429 FLD. 20/12

•ARPA ORDER-624
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
SEISMIC DATA LAB-139
AD-629 739 FLD. 8/11
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
SEISMIC DATA LAB-136
AD-629 931 FLD. 8/11

•AT(29-2)-1229
HAZLETON-NUCLEAR SCIENCE CORP PALO ALTO CALIF EARTH SCIENCES DIV
(ARPA-VUF-1014)
F AD-629 907 FLD. 18/3

•AT(49-2)-1167
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
USNRDL-TR-970
AD-628 997 FLD. 7/4

•AT(49-5)-2084
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
USNRDL-TR-940
AD-629 409 FLD. 18/3

•CDH-SR-59-19
STANFORD RESEARCH INST MENLO PARK CALIF
AD-629 139 FLD. 15/3

•CDH-SR-60-37
STANFORD RESEARCH INST MENLO PARK CALIF
AD-629 139 FLD. 15/3

•DA-18-039-AMC-107(A)
ATOMICS INTERNATIONAL CANOGA PARK CALIF
AD-629 089 FLD. 18/4

•DA-19-020-ORD-4996
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
(AROD-349:20)
AD-629 393 FLD. 7/4

•DA-19-129-AMC-292(N)
MELPAR INC FALLS CHURCH VA
F AD-629 219 FLD. 6/8

•DA-19-129-QM-793
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS
729-F
F AD-629 427 FLD. 17/1

•DA-22-072-ORD-1251
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
TR-2
AD-629 284 FLD. 20/4
TR-4
AD-629 285 FLD. 20/4

•DA-28-043-AMC-00008(E)
WISCONSIN UNIV MADISON SOLAR ENERGY LAB
F AD-629 241 FLD. 10/2

•DA-28-043-AMC-00069(E)
EAGLE-PICHER CO JOPLIN MO COUPLES DEPT
AD-629 419 FLD. 10/3

•DA-28-043-AMC-00099(E)
COLUMBIA RADIATION LAB NEW YORK
(AROD-9231:6)
AD-629 445 FLD. 20/3

•DA-28-043-AMC-00282(E)
CBS LABS STAMFORD CONN
F AD-628 980 FLD. 17/2

•DA-28-043-AMC-00379(E)
ELECTRONIC DEFENSE LABS SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
EDL-M892
AD-629 198 FLD. 9/5
EDL-M891
AD-629 306 FLD. 9/5
EDL-M928
AD-629 631 FLD. 9/1

•DA-28-043-AMC-00478(E)
MOTOROLA INC CHICAGO ILL COMMUNICATIONS DIV
F AD-628 988 FLD. 17/2

•DA-28-043-AMC-00480(E)
VARIAN ASSOCIATES PALO ALTO CALIF
ENGINEERING-329-30
AD-629 193 FLD. 20/6

•DA-28-043-AMC-01309(E)
TECHNICAL OPERATIONS INC BURLINGTON MASS
TO-B-65-99
(ECOM-TR-01309-1)
AD-629 002 FLD. 18/8

•DA-28-043-AMC-01338(E)
MICHIGAN UNIV ANN ARBOR DEPT OF GEOLOGY AND MINERALOGY
07325-1-T
(ECOM-01338(E)-1)
AD-629 438 FLD. 8/7

•DA-28-043-AMC-01377(E)
TRAVELERS RESEARCH CENTER INC HARTFORD CONN
(ECOM-01377-2)
AD-629 277 FLD. 19/4

•DA-28-043-AMC-01394(E)
ELECTRIC STORAGE BATTERY CO YARDLEY PA
(ECOM-01394-1)
AD-628 961 FLD. 10/3

•DA-28-043-AMC-01442(E)
GENERAL ELECTRIC CO SYRACUSE N Y ELECTRONICS LAB
(ECOM-01442-1)
AD-629 586 FLD. 9/2

•DA-28-043-AMC-01460(E)
MONSANTO RESEARCH CORP EVERETT MASS BOSTON LAB
MRB-402811
(ECOM-01460-1)
AD-629 220 FLD. 10/2

•DA-28-043-AMC-01549(E)
NATIONAL ENGINEERING SCIENCE CO HOUSTON TEX
(ECOM-01549(E)-1)
AD-629 163 FLD. 9/2

•DA-29-090-ORD-2410 4
SCHELLENGER RESEARCH LABS TEXAS WESTERN COLL EL PASO
F AD-629 653 FLD. 14/2

•DA-30-069-AMC-589(R)
RENSSELAER POLYTECHNIC INST TROY N Y DEPT OF MECHANICS
AD-629 739 FLD. 20/2

•DA-30-069-AMC-597(X)
WESTON INSTRUMENTS INC NEWARK N J
(AMRA-CR-65-02/1-PT-1)
F AD-629 726 FLD. 11/6
(AMRA-CR-65-02/1-PT-2)
F AD-629 727 FLD. 11/6

•DA-30-069-ORD-216
TOUR (SAM) AND CO INC NEW YORK
F AD-629 015 FLD. 13/8

•DA-30-069-ORD-2554
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
AD-629 910 FLD. 9/5

•DA-31-124-ARO(D)-87
SYRACUSE UNIV N Y DEPT OF ELECTRICAL ENGINEERING
(AROD-3999:2)
AD-629 403 FLD. 17/2.1
SYRACUSE UNIV N Y DEPT OF MATHEMATICS
(AROD-3999:9)
AD-629 399 FLD. 12/1

•DA-31-124-ARO(D)-117
WETHERILL CHEMISTRY LABS PURDUE UNIV LAFAYETTE IND
(AROD-1287:11)
AD-629 948 FLD. 7/3
(AROD-1287:12)
AD-629 950 FLD. 7/3

•DA-31-124-ARO(D)-137
PURDUE UNIV LAFAYETTE IND
(AROD-4282:1)
AD-629 920 FLD. 20/13

•DA-31-124-ARO(D)-172
VERMONT UNIV BURLINGTON DEPT OF PHYSICS
(AROD-4403:9)

AD-629 396 FLD. 7/4

•DA-31-124-ARO(D)-182
TULANE UNIV NEW ORLEANS LA DEPT OF CHEMISTRY
(AROD-4375:7)
AD-629 394 FLD. 7/3

•DA-31-124-ARO(D)-203
RIAS INC BALTIMORE MD
(AROD-5084:5)
AD-629 397 FLD. 7/4

•DA-31-124-ARO(D)-224
COLUMBIA RADIATION LAB NEW YORK
(AROD-4231:6)
AD-629 448 FLD. 20/5

•DA-31-124-ARO(D)-237
CALIFORNIA UNIV SAN DIEGO DEPT OF CHEMISTRY
(AROD-5133:3)
AD-629 398 FLD. 20/10

•DA-31-124-ARO(D)-270
BROWN UNIV PROVIDENCE R I DIV OF APPLIED MATHEMATICS
(AROD-5145:3)
AD-629 446 FLD. 12/1

•DA-31-124-ARO(D)-277
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF ENGINEERING RESEARCH
(AROD-5010:6)
AD-629 395 FLD. 11/6

•DA-31-124-ARO(D)-292
PRINCETON UNIV N J
(AROD-5105:2)
AD-629 408 FLD. 9/4
(AROD-5105:3)
AD-629 409 FLD. 9/4

•DA-31-124-ARO(D)-322
NORTHWESTERN UNIV EVANSTON ILL TECHNOLOGICAL INST
SRM-128
AD-628 976 FLD. 12/2

•DA-31-124-ARO(D)-325
CORNELL UNIV ITHACA N Y
(AROD-5329:1)
AD-629 417 FLD. 20/9

•DA-36-039-ORD-3519RD
RIAS INC BALTIMORE MD
(AFOSR-65-2321)
AD-629 269 FLD. 12/1
(AFOSR-65-2322)
AD-629 272 FLD. 12/1

•DA-36-039-AMC-00394(E)
ELECTRICAL ENGINEERING RESEARCH LAB CORNELL UNIV ITHACA N Y
TR-90
AD-628 993 FLD. 17/2

•DA-36-039-AMC-00097(E)
MICROWAVE ASSOCIATES INC BURLINGTON MASS
F AD-629 537 FLD. 20/9

•DA-36-039-AMC-01471(E)
CLEVITE CORP BEDFORD OHIO PIEZOELECTRIC DIV
AD-629 718 FLD. 9/1

•DA-36-039-AMC-03200(E)
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
AD-628 926 FLD. 9/1
TR-440
AD-628 956 FLD. 9/4

•DA-36-039-AMC-03630(E)
CORNELL-DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO
NORWOOD MASS
AD-629 199 FLD. 9/1

•DA-36-039-AMC-03633(E)
BULOVA WATCH CO WOODSIDE N Y ELECTRONICS DIV
AD-629 434 FLD. 9/1

•DA-36-039-AMC-03703(E)
ILLINOIS UNIV URBANA ELECTRICAL ENGINEERING RESEARCH LAB
AD-629 430 FLD. 9/1
AD-629 449 FLD. 9/1

•DA-36-039-AMC-06195(E)
FAIRCHILD SEMICONDUCTOR DIV FAIRCHILD CAMERA AND INSTRUMENT CORP MOUNTAIN VIEW CALIF
AD-629 286 FLD. 9/1
AD-629 717 FLD. 9/1

•DA-36-039-AMC-06198(E)
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
AD-628 990 FLD. 9/1

•DA-36-039-AMC-06165(E)
GENERAL ELECTRIC CO HUDSON FALLS N Y CAPACITOR DEPT
AD-629 733 FLD. 11/9

•DA-36-039-AMC-06168(E)
LINDE DIV UNION CARBIDE CORP EAST CHICAGO IND
AD-629 170 FLD. 20/9

•DA-36-039-AMC-06169(E)
GENERAL ELECTRIC CO IRMO S C ELECTRONIC SPECIALTY CAPACITOR BUSINESS SECTION
AD-629 385 FLD. 9/1

•DA-36-039-SC-85985
ITT ELECTRON TUBE DIV EASTON PA
AD-629 287 FLD. 9/1

•DA-36-039-SC-86737
LEWIS (E B) CO INC EAST HARTFORD CONN
AD-629 178 FLD. 9/1

•DA-36-AMC-00040(E)
STANFORD RESEARCH INST MENLO PARK CALIF
STR-17
AD-629 195 FLD. 9/9

•DA-38-109-CIVENG-59-112
FRITZ ENGINEERING LAB LEHIGH UNIV BETHLEHEM PA
FL-277-PR-33
AD-629 012 FLD. 13/11

•DA-44-009-ENG-9291
GARRETT CORP LOS ANGELES CALIF AIRESEARCH MFG DIV
F-4341-REV-1
F AD-629 862 FLD. 10/2

•DA-44-177-AMC-21(T)
HAWKER-SIDDELEY CANADA LTD TORONTO (ONTARIO)
(USAAVLABS-TR-65-83)
AD-629 648 FLD. 1/3

•DA-44-177-AMC-48(T)
DYNASCIENCES CORP FORT WASHINGTON PA
DCR-174
(USAAVLABS-TR-65-81)
AD-629 637 FLD. 1/1

•DA-44-177-AMC-91(T)
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-890
AD-629 629 FLD. 20/4

•DA-44-177-AMC-196(T)
KAMAN AIRCRAFT CORP BLOOMFIELD CONN
KAMAN R-974
(USAAVLABS-TR-65-75)
F AD-629 636 FLD. 13/9

•DA-44-177-AMC-204(T)
ROCHESTER APPLIED SCIENCE ASSOCIATES INC N Y•
RASA-65-10
(USAAVLABS-TR-65-82)
AD-629 646 FLD. 20/1

•DA-44-177-AMC-288(T)
DYNATECH CORP CAMBRIDGE MASS
DYNATECH-620
(USAAVLABS-TR-66-11)
AD-629 635 FLD. 1/3

•DA-44-177-AMC-319(T)
BOEING CO MORTON PA VERTOL DIV
R-432
(USAAVLABS-TR-65-80)
AD-629 647 FLD. 1/1

•DA-44-177-TC-629
OPERATIONS RESEARCH INC SILVER SPRING MD
TR-109
AD-629 642 FLD. 1/2

•DA-44-188-ARO-1
RESEARCH ANALYSIS CORP MCLEAN VA
RAC-TP-171
AD-629 384 FLD. 12/2
RAC-TP-209
AD-629 700 FLD. 9/1

•DA-44-188-ARO-2
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
AD-628 962 FLD. 9/9
TR-65-11
AD-629 309 FLD. 9/9
TR-65-12
AD-629 443 FLD. 9/9
TR-65-15
AD-629 444 FLD. 9/7

•DA-49-007-MD-794
ILLINOIS UNIV CHICAGO COLL OF MEDICINE
AD-629 918 FLD. 6/5

•DA-49-186-AMC-126(D)
JOHNSON SERVICE CO MILWAUKEE WIS
F AD-629 055 FLD. 13/7
JOHNSON SERVICE CO MILWAUKEE WIS•
F AD-629 056 FLD. 13/7

•DA-49-193-MD-2238
MARYLAND UNIV COLLEGE PARK DEPT OF ZOOLOGY
AD-629 379 FLD. 6/3

•DA-49-193-MD-2349
MIAMI UNIV CORAL GABLES FLA SCHOOL OF MEDICINE
AD-629 727 FLD. 6/16

•DA-49-193-MD-2391
BRITISH COLUMBIA RESEARCH COUNCIL VANCOUVER
AD-629 392 FLD. 6/6

•DA-49-193-MD-2396
CALIFORNIA UNIV BERKELEY
AD-629 017 FLD. 6/5

•DA-49-193-MD-2938
WAKOFF RESEARCH CENTER STATEN ISLAND N Y
TR-2
A AD-629 630 FLD. 9/9

•DA-ARO-49-092-65-671
BUENOS AIRES UNIV (ARGENTINA) CATEDRA DE FISICA BIOLOGICA
F AD-629 219 FLD. 6/18

•DA-ARO-49-092-65-672
CHILE UNIV SANTIAGO SERVICIO NACIONAL DE SALUD
F AD-629 016 FLD. 5/10

•DA-ARO-49-092-65-676

GRUPO DE RADIO-ASTRONOMICA
UNIVERSIDADE MACKENZIE SAO PAULO
(BRAZIL)
GRAM-10
A AD-628 887 FLD. 4/1

•DA-ARO(D)-31-124-G106
WETHERILL CHEMISTRY LABS PURDUE
UNIV LAFAYETTE IND
(AROD-1287:13)
AD-629 470 FLD. 7/3

•DA-ARO(D)-31-124-G242
MORLEY CHEMICAL LAB WESTERN RESERVE
UNIV CLEVELAND OHIO
(AROD-3342:7)
AD-629 477 FLD. 7/3

•DA-ARO(D)-31-124-G343
ILLINOIS UNIV URBANA DEPT OF
PHYSICS
TR-1
(AROD-2771:11)
AD-629 096 FLD. 4/2

•DA-ARO(D)-31-124-G387
IOWA UNIV IOWA CITY DEPT OF
CHEMISTRY
(AROD-1733:21)
AD-629 464 FLD. 7/4
(AROD-1733:23)
AD-629 465 FLD. 7/4

•DA-ARO(D)-31-124-G424
NEW YORK UNIV N Y
(AROD-4084:9)
AD-629 702 FLD. 20/12

•DA-ARO(D)-31-124-G430
UTAH STATE UNIV LOGAN DEPT OF
CHEMISTRY
(AROD-4180:2)
AD-629 467 FLD. 7/4

•DA-ARO(D)-31-124-G489
ROCHESTER UNIV N Y
(AROD-4374:6)
AD-629 498 FLD. 20/3
ROCHESTER UNIV N Y DEPT OF
PHYSICS AND ASTRONOMY
(AROD-4374:2)
AD-629 460 FLD. 20/3
(AROD-4374:3)
AD-629 463 FLD. 20/3

•DA-ARO(D)-31-124-G-496
TEXAS UNIV AUSTIN DEPT OF
CHEMISTRY
(AROD-4388:1)
AD-629 498 FLD. 7/4

•DA-ARO(D)-31-124-G569
ROCHESTER UNIV N Y DEPT OF
PHYSICS AND ASTRONOMY
(AROD-4969:10)
AD-629 457 FLD. 20/9

•DA-ARO(D)-31-124-G607
OXFORD UNIV (ENGLAND) DEPT OF
THEORETICAL PHYSICS
(AROD-893:108)
AD-629 703 FLD. 20/8

•DA-ARO(D)-31-124-G770
DUKE UNIV DURHAM N C DEPT OF
CHEMISTRY
(AROD-3581:12)
AD-629 497 FLD. 7/3

•DA-MD-49-193-63-G101
ARMED FORCES INST OF PATHOLOGY
WASHINGTON D C GEOGRAPHIC
PATHOLOGY DIV
AD-629 349 FLD. 6/5

•DRB-2801-18
UNIVERSITY OF WESTERN ONTARIO
LONDON DEPT OF PHYSICS
AD-629 325 FLD. 20/14
AD-629 356 FLD. 4/1

•DRB-D9511-37
CANADIAN SERVICES COLL VICTORIA
(BRITISH COLUMBIA)
AD-629 319 FLD. 20/14

•DRB-PC-69-513001
SASKATCHEWAN UNIV SASKATOON INST
OF UPPER ATMOSPHERIC PHYSICS
AD-629 326 FLD. 4/1

•N102-76878
BATTELLE MEMORIAL INST COLUMBUS
OHIO
F AD-629 650 FLD. 13/11

•N123(60930)32887A
CALIFORNIA UNIV LOS ANGELES DEPT
OF ENGINEERING
66-9
AD-628 969 FLD. 6/5

•N228(62479)65776
TECHNICAL OPERATIONS INC
BURLINGTON MASS
TO-B-69-27
F AD-629 180 FLD. 18/6
TO-B-69-27
F AD-629 217 FLD. 18/6

•N600(61533)61992
WESTINGHOUSE ELECTRIC CORP LIMA
OHIO AEROSPACE ELECTRICAL DIV
AD-629 006 FLD. 10/2

•N600(61533)-63219
GENERAL ELECTRIC CO SCHENECTADY N
Y RESEARCH AND DEVELOPMENT CENTER
F AD-629 598 FLD. 11/6

•N61533-823-65
WAYNE STATE UNIV DETROIT MICH
COLL OF ENGINEERING
(MEL-292/65)
AD-629 372 FLD. 20/11

•N62269-1388
LITTLE (ARTHUR D) INC CAMBRIDGE
MASS
(NADC-MR-6903)
AD-629 590 FLD. 14/2

•NASA ORDER-S-81-71-G11
NAVAL RESEARCH LAB WASHINGTON D C
NRL-MR-1099
AD-628 894 FLD. 21/8

•NASW-718
RIAS INC BALTIMORE MD
(AFOSR-65-2323)
AD-629 270 FLD. 12/1

•NASW-849
RIAS INC BALTIMORE MD
(AFOSR-65-2330)
AD-629 271 FLD. 12/2

•NBY-49818
STANFORD UNIV CALIF DEPT OF CIVIL
ENGINEERING
TR-45
AD-628 940 FLD. 5/9

•NBY-62174
GENERAL ELECTRIC CO BALTIMORE MD
INSULATOR DEPT
TR-LK-805
F AD-629 439 FLD. 11/7

•NIH-NB-5379
ARMED FORCES INST OF PATHOLOGY
WASHINGTON D C
AD-629 342 FLD. 6/5

•NOBS-90029
WESTINGHOUSE ATOMIC POWER DIV
PITTSBURGH PA
WAPD-TM-505
AD-629 436 FLD. 20/11

•NOBS-90041
FRITZ ENGINEERING LAB LEHIGH UNIV
BETHLEHEM PA
248/273.3
F AD-628 978 FLD. 13/13

•NOBSR-92320
RADIO CORP OF AMERICA CAMDEN N J
DEFENSE ELECTRONIC PRODUCTS
AD-629 596 FLD. 9/5

•NONR-220(40)
CALIFORNIA INST OF TECH PASADENA
DIV OF CHEMISTRY AND CHEMICAL
ENGINEERING
(AFOSR-66-0340)
AD-629 280 FLD. 7/4
(AFOSR-65-2369)
AD-629 282 FLD. 7/4

•NONR-220(50)
CALIFORNIA INST OF TECH PASADENA
TR-29
AD-629 535 FLD. 20/9

•NONR-222(85)
CALIFORNIA UNIV BERKELEY DEPT OF
MATHEMATICS
AD-629 107 FLD. 12/1

•NONR-222(89)
CALIFORNIA UNIV BERKELEY SPACE
SCIENCES LAB
SERIES-7-ISSUE-5
AD-629 087 FLD. 8/14

•NONR-225(48)
MICROWAVE LAB STANFORD UNIV CALIF
ML-1410
AD-628 991 FLD. 20/5

•NONR-225(53)
STANFORD UNIV CALIF DEPT OF
STATISTICS
TR-88
AD-629 308 FLD. 12/2
TR-86
AD-629 375 FLD. 12/1

•NONR-225(83)
STANFORD UNIV CALIF DEPT OF
ELECTRICAL ENGINEERING
(AFOSR-65-2356)
AD-629 369 FLD. 9/4

•NONR-225(89)
STANFORD UNIV CALIF DEPT OF
STATISTICS
TR-88
AD-629 308 FLD. 12/2

•NONR-233(28)
CALIFORNIA UNIV LOS ANGELES
F AD-628 975 FLD. 7/4

•NONR-233(44)
CALIFORNIA UNIV LOS ANGELES DEPT
OF PHYSICS
TR-P-74
AD-628 932 FLD. 20/8

•NONR-233(73)
WESTERN MANAGEMENT SCIENCE INST
UNIV OF CALIFORNIA LOS ANGELES
WMSI WORKING PAPER-95
AD-629 521 FLD. 12/2

•NONR-233(75)
WESTERN MANAGEMENT SCIENCE INST
UNIV OF CALIFORNIA LOS ANGELES
WMSI WORKING PAPER-89
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AFOSR-65-2598
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AFOSR-65-2600
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AFOSR-65-2775
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AFOSR-65-2776
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AFOSR-65-2780
AD-629 616 FLD. 20/10

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AFOSR-65-2820
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AFOSR-66-0127
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AFOSR-66-0276
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AFOSR-66-0277
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AFOSR-66-0279
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AFOSR-66-0302
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AFOSR-66-0303
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AFOSR-66-0305
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AFOSR-66-0316
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AFOSR-66-0318
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AFOSR-66-0326
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AFOSR-66-0364
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AFOSR-66-0365
AD-628 924 FLD. 20/9

AFOSR-66-0383
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AFOSR-66-0393
AD-629 690 FLD. 20/4

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629 436	20/11
629 437	3/2
629 438	8/7
629 439	11/7
629 440	20/11
629 441	1/2
629 442	9/5
629 443	5/9
629 444	5/7
629 445	20/5
629 446	12/1
629 447	10/2
629 448	7/3
629 449	9/1
629 450	7/3
629 451	9/1
629 452	17/8
629 453	1/2
629 454	17/9
629 455	5/7
629 456	19/1
629 457	20/5
629 458	20/3
629 459	6/3
629 460	20/3
629 461	6/3
629 462	6/3
629 463	20/3
629 464	7/9
629 465	7/9
629 466	8/11
629 467	7/9
629 468	9/5
629 469	5/6
629 470	7/3
629 471	20/9
629 472	7/9
629 473	17/2
629 474	21/5
629 475	13/11
629 476	10/2
629 477	7/3
629 478	7/5
629 479	7/5
629 480	7/9
629 481	20/2
629 482	20/2
629 483	7/9
629 484	9/3
629 485	7/3
629 486	12/1
629 487	12/2
629 488	7/3
629 489	7/5
629 490	11/2
629 492	7/3
629 493	20/12
629 494	9/2
629 495	20/12
629 496	20/9
629 497	7/3
629 498	7/9
629 499	20/9
629 500	11/6
629 501	10/3
629 502	9/1
629 503	20/5
629 504	7/9
629 505	12/2
629 506	12/1
629 507	7/9
629 508	20/12
629 509	13/5
629 510	13/10
629 511	18/9
629 512	6/18
629 513	14/5
629 514	20/12
629 515	7/3
629 516	17/2.1
629 517	1/3
629 518	12/1
629 519	12/2
629 520	12/2
629 521	12/2
629 522	13/6
629 523	20/8
629 524	9/2
629 525	12/1
629 526	13/11
629 527	9/2
629 528	12/1
629 529	12/1
629 530	12/1
629 531	7/9
629 532	8/11
629 533	20/9
629 535	20/9
629 536	20/13
629 537	20/9
629 538	12/1
629 539	9/9
629 540	20/10
629 541	20/10
629 542	14/2
629 543	9/5
629 544	15/5
629 545	18/9
629 546	9/5
629 547	7/3
629 548	6/15
629 549	7/3
629 550	17/2
629 551	7/2
629 552	7/2
629 553	7/3
629 554	7/3
629 555	9/9
629 556	9/1
629 557	20/2
629 558	20/12
629 559	6/16
629 560	6/16
629 561	6/16
629 562	10/2
629 563	6/15
629 564	5/1
629 565	20/2
629 566	9/10
629 567	12/1
629 568	20/11
629 569	9/9
629 570	11/2
629 571	9/1
629 572	1/5
629 573	5/9
629 574	5/9
629 575	5/9
629 576	18/8
629 577	20/9
629 578	9/5
629 579	20/11
629 580	20/11
629 581	16/9
629 582	8/10
629 583	17/7
629 584	17/2.1
629 585	21/9.2
629 586	9/2
629 587	9/1
629 588	9/2
629 589	6/16
629 590	14/2
629 591	12/1
629 592	13/10
629 593	12/1
629 594	5/10
629 595	12/1
629 596	9/9
629 597	12/1
629 598	11/6
629 599	6/16
629 600	12/1
629 601	17/9
629 602	12/1
629 603	11/5
629 604	12/1
629 605	12/1
629 606	9/2
629 607	18/6
629 608	20/12
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629 610	20/9
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629 612	7/9
629 613	7/9
629 614	7/9
629 615	20/12

629 616	20/10
629 617	12/1
629 618	12/1
629 619	12/1
629 620	9/5
629 621	12/1
629 622	6/11
629 624	6/16
629 625	20/4
629 626	12/1
629 627	3/2
629 628	8/2
629 629	20/4
629 630	5/9
629 631	9/1
629 632	1/1
629 633	13/1
629 634	13/1
629 635	1/3
629 636	13/9
629 637	1/1
629 638	7/3
629 639	7/3
629 640	7/3
629 641	7/3
629 642	1/2
629 643	20/4
629 644	11/6
629 645	20/14
629 646	20/1
629 647	1/1
629 648	1/3
629 649	12/1
629 650	13/11
629 651	7/4

629 652	7/4
629 653	14/2
629 654	20/12
629 655	20/10
629 656	7/4
629 657	20/12
629 658	20/12
629 659	20/12
629 660	20/12
629 661	20/12
629 662	4/2
629 663	7/4
629 664	9/3
629 665	7/4
629 666	20/4
629 667	6/3
629 668	20/2
629 670	19/4
629 671	7/5
629 672	8/10
629 673	13/10
629 674	11/8
629 675	8/12
629 676	20/8
629 677	5/10
629 678	5/10
629 679	5/10
629 680	5/10
629 681	7/3
629 682	3/2
629 683	7/3
629 684	20/13
629 685	12/1
629 686	9/5
629 687	12/1

629 688	20/12
629 689	20/12
629 690	20/4
629 691	9/3
629 692	5/7
629 693	5/7
629 694	5/7
629 695	5/7
629 696	4/1
629 697	5/10
629 698	20/2
629 699	11/2
629 700	5/1
629 701	20/2
629 702	20/12
629 703	20/8
629 704	20/6
629 705	8/5
629 706	13/8
629 707	6/20
629 708	13/8
629 709	18/5
629 710	20/6
629 711	7/3
629 712	12/1
629 713	20/2
629 714	20/3
629 715	7/4
629 716	20/12
629 717	9/1
629 718	9/1
629 719	20/13
629 720	11/9

629 721	9/1
629 722	17/9
629 723	6/18
629 724	17/1
629 725	1/3
629 726	11/6
629 727	11/6
629 728	20/14
629 729	9/2
629 730	6/16
629 731	11/3
629 732	19/4
629 733	11/9
629 734	20/2
629 735	13/10
629 736	15/3
629 737	6/16
629 738	6/5
629 739	8/11
629 740	7/3
629 741	6/5
629 742	7/3
629 743	9/5
629 744	7/3
629 745	20/2
629 746	7/3
629 747	7/4
629 748	7/3
629 749	20/2
629 750	7/3
629 751	7/3
629 752	14/2

OTHER RESEARCH REPORTS AND RELATED MATERIAL

1. AERONAUTICS

N66-12138 **Field 1A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration. George C. Marshall Space Flight Center, Huntsville, Ala.
AERODYNAMIC CHARACTERISTICS OF SPHERICALLY BLUNTED CONES AT MACH NUMBERS FROM 0.5 TO 5.0,
by R. V. Owens. Dec 65, 60p NASA-TN-D-3088

Descriptors: (*Blunt bodies, Aerodynamic characteristics).

N66-12140 **Field 1A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PERFORMANCE CHARACTERISTICS OF A 4-FOOT-DIAMETER DUCTED FAN AT ZERO ANGLE OF ATTACK FOR SEVERAL FAN BLADE ANGLES,
by K. W. Mort. Dec 65, 19p NASA-TN-D-3122

Descriptors: (*Ducted fans, Performance (Engineering).

N66-12984 **Field 1A**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
RESULTS OF THE JPL AERODYNAMIC DAMPING-INPITCH WIND-TUNNEL PROGRAM,
by D. A. Nelson. 2 Nov 62, 49p WT-20-499
Contract NAS7-100
NASA CR-68186

Descriptors: (*Damping, Aerodynamic characteristics), Hypersonic wind tunnels, Pitch.

3. ASTRONOMY AND ASTROPHYSICS

N66-10649 **Field 3A**
CFSTI Prices: HC$4.00 MF$1.00
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.
CATALOG OF PRECISELY REDUCED OBSERVATIONS, NO. P-14.
3 Sep 65, 128p SAO Special rept.-185
Contract NsG-87-60
NASA CR-67847

Descriptors: (*Satellites (Artificial), Tracking).

Identifiers: ECHO.

N66-11213 **Field 3A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A QUASI-STATIONARY CO-ROTATING STRUCTURE IN THE INTERPLANETARY MEDIUM,
by N. F. Ness and J. M. Wilcox. Jul 65, 39p
NASA-TM-X-55317, X-612-65-302

Descriptors: (*Planetary atmospheres, Magnetic fields), Terrestrial magnetism.

Identifiers: IMP (interplanetary monitoring platform).

N66-12182 **Field 3B, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
PHOTOMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES.
Quarterly progress rept., 1 Jul-30 Sep 65,
by J. D. Halajian and F. A. Spagnolo. Oct 65, 20p RM-297
Contract NAS9-3182
NASA CR-65168

Descriptors: (*Photometers, Lunar environment), (*Lunar environment, Simulation), Moon, Terrain, Surfaces.

N66-12863 **Field 3B, 14B**
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill. Technology Center.
A HIGH ALTITUDE MEASUREMENT TO DETERMINE THE RATIO OF DEUTERIUM TO HYDROGEN IN THE SOLAR ATMOSPHERE.
Quarterly status rept., Jun 1-Aug 31, 65,
by G. Henderson. 21 Oct 65, 12p IITRI-A6141-QR1
Contract NASr 65/13/
NASA CR-68240

Descriptors: (*Deuterium, Solar atmosphere), (*Hydrogen, Solar atmosphere), High altitude, Measurement, Interferometers.

Identifiers: Fabry-Perot interferometer.

N66-12967 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Stanford Electronics Labs.
THE BISTATIC CONTINUOUS-WAVE RADAR METHOD FOR THE STUDY OF PLANETARY SURFACES.
Scientific rept. no. 13,
by G. L. Tyler. Oct 65, 23p SEL-65-096
Grant NsG-377
NASA CR-68312

Descriptors: (*Planets, Mapping), (*Continuous wave radar, Surfaces).

N66-12980 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill.
STUDIES OF LUNAR AND MARTIAN SOIL MECHANICS.
Quarterly progress rept. no. 3, Jun - 15 Sep 65,
by J. D. Nelson and E. Vey. 30 Sep 65, 16p
Contract NASR-65/02/
NASA CR-68308

Descriptors: (*Soil mechanics, Moon), (*Mars, Soil mechanics).

N66-12996 **Field 3B**
CFSTI Prices: HC$1.00 MF$0.50
Institute for Advanced Study, Princeton, N. J.
WAVE LENGTH DEPENDENCE OF POLARIZATION BY SMALL GRAPHITE FLAKES,
by J. M. Greenberg. 1965, 11p
NASA CR-68373

Descriptors: (*Light, Polarization), (*Graphite, Wave transmission).

4. ATMOSPHERIC SCIENCES

AD-465 928 **Field 4A, 3B**
CFSTI Prices: HC$4.00 MF$0.75
Weather Group (4th), Andrews AFB, Washington, D. C.
THE RADIATION ENVIRONMENT.
1 Jun 65, 102p 4WGP-80-6-1

Descriptors: (*Space environmental conditions, Textbooks), (*Astrophysics, Textbooks), (*Meteorology, Textbooks), Solar wind, Upper atmosphere, Electro magnetic waves, Solar radiation, Cosmic rays, Terrestrial magnetism, Radiation damage, Materials, Radiobiology.

This pamphlet summarizes current knowledge of the radiation environment. The interactions between the solar wind and the earth's magnetosphere are described in some detail since these interactions have such a profound effect on the radiation environment. Both qualitative and quantitative estimates of the energy levels and intensity of electromagnetic, cosmic, and corpuscular radiation are presented in terms of their potential hazard to materials and biological specimens in aerospace. (Author)

AD-467 000 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex. Environmental Sciences Directorate.
SPECTRAL TRANSMISSIVITY OF THE EARTH'S ATMOSPHERE IN THE 250 TO 500 WAVE NUMBER INTERVAL. PART III. A METHOD OF EXPERIMENTALLY DERIVING TRANSMISSIVITY,
by James T. Hall, Charles W. Querfeld, Glenn B. Hoidale, and Ramon Mireles. Jun 65, 24p
ERDA-315
Proj. DA-1L013001A91A

Descriptors: (*Absorption spectrum, Infrared radiation), (*Atmosphere, Wave transmission), Solar spectrum, Spectra (Infrared), Water vapor, Spectrum analyzers.

Experimental observations of the transparency of the earth's atmosphere in the 20 to 40 micron region of the far infrared were carried out at 111 feet below sea level, 10,150 feet above sea level and 14,250 feet above sea level. The resultant solar spectra were compared to the theoretically computed spectra using the Lorentz line shape and the tabulated halfwidths, line strength and positions, with consideration given to the time-varying meteorological conditions that the radiation encountered in the slant path from the sun to the instrument. A method for determining transmissivity from the experimental data is derived. The total amount of precipitable water vapor in the zenith direction is given. Sample comparisons of the experimentally determined transmissivity and the observed spectra are shown.

AD-467 259 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.50
Army Missile Command, Redstone Arsenal, Ala. Physical Sciences Lab.
SEASONAL MODELS OF AIR DENSITY, TEMPERATURE AND WIND BETWEEN SURFACE AND 25 KM FOR FOUR GEOGRAPHIC ZONES,
by Oskar M. Essenwanger and Helmut P. Dudel.
28 May 65, 24p Rept. no. RR-TR-65-8
Proj. DA-1V014501B53A

Descriptors: (*Atmosphere models, Climatology), (*Climatology, Atmosphere models), (*Meteorology, Atmosphere models), Upper atmosphere, Density, Atmospheric temperature, Wind, Tables.

Twenty sets of air density values are presented at one km intervals between 0 km and 25 km altitude. These profiles represent mean and 'one-sigma' conditions in four zones (tropics, subtropics, temperate and polar) and for summer, winter and annual reference periods. 'One-sigma' profiles have been established by incorporating the vertical relationship between densities at height levels. In addition, temperature profiles are given which are most probably associated with each density profile. Also, values of mean scalar wind speed and of vector standard deviation are presented for the same height levels, zones and reference periods. (Author)

AD-470 339 **Field 4A, 20N**
CFSTI Prices: HC$5.00 MF$1.00
Stanford Research Inst., Menlo Park, Calif.
STUDIES OF RF SCATTERING PROCESSES FROM IONIZED UPPER ATMOSPHERIC PERTURBATIONS.
Final rept., Jul 64-Aug 65,
by D. R. Allison and W. G. Chesnut. Jul 65, 160p
Contract AF19 (628)-3296, ARPA Order-42-61, Proj. AF-4984,
Tasks 498401, SRI-4592
AFCRL 65-517

Descriptors: (*Atmospheric sounding, Radar signals), (*Ionosphere, Radar reflections), (*Radar reflections, Ionosphere), Chemicals, Injection, Atmosphere, Electron density, Electromagnetic waves, Scattering, Probes, Doppler effect.

Identifiers: Firefly project.

A special study is made of negatively shifted Doppler radar signals observed following high-altitude, high-explosive detonations. Suggested causes of these negatively shifted signals are presented. The data obtained during 3-electron affinity chemical releases in the F-region are given special study. A qualitative model is suggested which explains some of the observed data. Effects on other electron affinity releases seem far more complex and do not seem to be explained well by a simple model. Quantitative cross-section estimates are made. The dearth of effects on point electron cloud releases at altitudes above 150 km has led to a careful study of high-explosive hydrodynamics in this altitude region. A study is made of the criteria of importance to the use of continuum hydrodynamics at high altitudes. A decision criterion is suggested. A theory is developed which predicts altitude limits on the generation of air shock waves. The theory also predicts quite well equilibrium-high-explosive radii observed in the altitude region of 90 km to 120 km and in other tests which have been applied. The theory also seems to predict fairly well effects observed on events Fanny and Gilda. A separately bound appendix presents our thoughts regarding simulation of missile launch phenomena by means of high-altitude chemical releases. (Author)

C13.46:326 **Field 4A, 20N**
CFSTI Price: MF$0.75
Central Radio Propagation Lab., Boulder, Colo.
AN ATLAS OF SOLAR FLARE EFFECTS IN THE IONOSPHERE OBSERVED WITH A HIGH-FREQUENCY DOPPLER TECHNIQUE, SEPTEMBER 1960DECEMBER 1962,
by Donald M. Baker. 1 Dec 65, 116p
NBS TN-326
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.60.

Descriptors: (*Solar flares, Ionospheric disturbances), (*Ionospheric disturbances, Solar flares), (*Atmospheric sounding, Doppler effect), (*Doppler effect, Atmospheric sounding), High frequency, Radio waves, Ionospheric propa gation, Attenuation.

N66-10430 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
NEUTRAL HYDROGEN IN THE EARTH'S ATMOSPHERE ABOVE 120 KM,
by M. Liwshitz. Oct 65, 43p NASA-TM-X-55298, X-640-65-428

Descriptors: (*Atmosphere, Hydrogen).

N66-10877 **Field 4B, 22B**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
TIROS RADIATION MEASUREMENTS AND VARIATIONS IN ATMOSPHERIC HEATING.
Quarterly progress rept. no. 2, 8 May-15 Aug 65,
by P. A. Davis and R. L. Mancuso. Aug 65, 35p
Contract NAS5-9540
NASA CR-67701

Descriptors: (*Atmospheric temperature, Solar radiation), (*Solar radiation, Measurement), Meteorological satellites, Heating.

N66-10958 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Geophysics Corp. of America, Bedford, Mass.
OBSERVED CHARACTERISTICS OF IONOSPHERIC WINDS,
by J. F. Bedinger and H. B. Knaflich. Aug 65, 35p GCA-TR-65-26-N
Contract NASw-1083
NASA CR-67913

Descriptors: (*Ionosphere, Wind), (*Condensation trails, Alkali metals), (*Twilight, Wind).

N66-11197 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
HOPI-DART AND CAJUN-DART ROCKET WIND MEASURING SYSTEMS,
by L. P. Gilchrist and R. E. Turner. 26 Jul 65, 25p NASA-TM-X-53303

Descriptors: (*Wind, Measurement).

Identifiers: Hopi-Dart, Cajun-Dart.

N66-11198 **Field 4A**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Cenfer.
METEOR WINDS MEASURED AT ADELAIDE 35 degs 1961,
by W. G. Elford and R. G. Roper. Jun 65, 166p
NASA-TM-X-55302, X-650-65-220

Descriptors: (*Wind, Measurement), (*Meteors, Wind).

N66-11206 **Field 4A**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
AURORAL ELECTROJET ACTIVITY INDEX AE AND ITS UNIVERSAL TIME VARIATIONS,
by T. N. Davis and M. Sugiura. Jun 65, 57p
NASA-TM-X-55310, X-612-65-264

Descriptors: (*Aurorae, Measurement), Indexes.

Identifiers: Electrojets, Auroral.

N66-11214 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE LOWER IONOSPHERE AT SOLAR MINIMUM,
by A. C. Aikin, J. L. Donley and R. E. Bourdeau. Jul 65, 36p NASA-TM-X-55318, X-615-65-304

Descriptors: (*Ionosphere, Measurement), (*Solar spectrum, Measurement).

Identifiers: Nike-Apache.

N66-11748 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
GCA Technology Div., GCA Corp., Bedford, Mass.
ROCKET OBSERVATIONS OF SPORADIC E AND RELATED FEATURES OF THE E REGION,
by L. G. Smith. Aug 65, 31p GCA-TR-65-22-N
Contract NASw-1083
NASA CR-68050
Presented at the Sporadic E Seminar, Estes Park, Calif., Jun 1965.

Descriptors: (*Ionosphere, Density), Electrons.

Identifiers: Sporadic E layer.

N66-12130 **Field 4B**
CFSTI Prices: HC$1.00 MF$0.75
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OBSERVATIONS FROM THE NIMBUS I METEROLOGICAL SATELLITE.
1965, 92p NASA-SP-89

Descriptors: (*Meterological satellites, Performance (Engineering).

Identifiers: Nimbus 1

N66-12172 **Field 4A, 14B**
CFSTI Prices: HC$1.00 MF$0.50.
National Bureau of Standards, Washington, D.C.
IONOSPHERIC SOUNDINGS FROM MOBILE LAUNCH PLATFORM.
Final rept.
1965, 2p
Contract NASA Order-R-148
NASA CR-68280

Descriptors: (*Ionosphere, Atmospheric sounding), (*Rocket launchers, Ships), Sounding rockets, Mobile.

N66-12187 **Field 4A**
CFSTI Prices: HC$1.00 MF$0.50
Space Physics Research Lab., Univ. of Michigan, Ann Arbor.
DIRECT MEASUREMENTS IN THE IONOSPHERE.
Final rept.,
by A. F. Nagy. Oct 65, 8p
Contract NAS-54/04/
NASA CR-68095

Descriptors: (*Ionosphere, Atmospheric soundings), (*Langmuir probes, Ionosphere), Electron density, Sounding rockets, Electrons, Temperature.

N66-12248 **Field 4A**
CFSTI Prices: HC$4.00 MF$1.00
GCA Technology Div, GCA Corp., Bedford, Mass.
EXPERIMENTAL AND THEORETICAL STUDIES IN PLANETARY AERONOMY.
Final rept.,
by F. F. Marmo. Apr 65, 133p GCA-TR-65-16-N
Contract NASw-840
NASA CR-68106

Descriptors: (*Planetary atmospheres, Scientific research), Photochemistry, Vacuum, Spectra (Visible + Ultraviolet), Theory.

Identifiers: Planetary aeronomy.

N66-12982 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Smithsonian Institution, Cambridge, Mass. Astrophysical Observatory.

DENSITY VARIATIONS IN THE HETEROSPHERE,
by L. G. Jacchia. 20 Sep 65, 27p SAD SR-184
Grant NsG 87-60
NASA CR-68304

Descriptors: (*Upper atmosphere, Density).

Identifiers: Heterosphere.

N66-12983 **Field 4B**
CFSTI Prices: HC$3.00 MF$0.50
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
ON THE USE OF INTERMEDIATE INFRARED AND MICROWAVE INFRARED IN WEATHER SATELLITES.
Annual rept. no. 1,
by K. J. K. Buettner, K. Katsaros, and W. Kreiss.
Sep 65, 53p
Grant NsG-632
NASA CR-68089

Descriptors: (*Meteorological satellites, Infrared equipment), (*Microwave equipment, Meteorological satellites), Infrared radiation.

PB-169 332 **Field 4A, 20N**
CFSTI Prices: HC$7.60 MF$0.75
Coast and Geodetic Survey, Wash., D. C.
TABLES AND FORMULAS FOR COMPUTATION OF REFRACTIVE INDEX OF THE ATMOSPHERE FOR MICRO-WAVES AND LIGHT WAVES,
by Austin C. Poling. Nov 63, 79p

Descriptors: (*Atmospheric refraction, Refractive index), (*Refractive index, Atmosphere refraction), Microwaves, Light transmission, Tables, Algo rithms, Optics.

PB-169 374 **Field 4B, 5C**
CFSTI Prices: HC$1.60 MF$0.50
Weather Bureau, Washington, D. C.
THE VALUE OF WEATHER FORECASTS.
Western Region note,
by Halbert E. Root. Dec 65, 12p WBTN-27-WR-3

Descriptors: (*Weather forecasting, Economics), (*Climatology, Weather forecasting), State-of-the-art reviews.

This study summarizes the relative value of weather forecasts to the economy considering the variation with the skill of the forecasts, the form in which the forecasts are expressed, and the climatological frequency of the critical weather event to be considered. Five levels of forecast information are studied: none, climatological information, conventional forecasts, probability forecasts, and perfect forecasts. It is shown that: (1) the potential value per unit potential loss of weather forecasts to any given segment of the economy is inversely proportional to the cost-to-loss ratio; (2) the potential value to the economy of weather forecasts over climatological information is inversely proportional to the climatological frequency of the critical weather event considered; (3) the range of the economy over which conventional forecasts are superior to climatological information is a function of the skill of the forecasts, with the greatest benefits realized by those segments of the economy with cost-to-loss ratios near the climatological frequency of the critical weather event considered; (4) the value of reliable probability forecasts is equal to or better than the value of conventional forecasts for all segments of the economy. (Author)

PB-169 375 **Field 4B**
CFSTI Prices: HC$1.60 MF$0.50
Weather Bureau, Washington, D. C.
FORECASTING NORTHERLY WINDS IN NORTHERN AND CENTRAL CALIFORNIA.
Western Region note,
by Wayne E. Harman. Dec 65, 12p WBTN-26-WR-2

Descriptors: (*Wind, Weather forecasting), (*Weather forecasting, Wind), California, Forest fires.

The influence of strong northerly winds on fire danger in central California is discussed. Objective aids for short-range prediction of northerly winds in California are reviewed, with emphasis on their application to the central coastal area of the State. Weaknesses of previously developed objective aids are examined and additional forecast aids are presented to correct their deficiencies. An application of the forecast system is illustrated by the strong north wind situation of September 20 - 24, 1964. This situation was associated with an extreme fire danger period and disastrous fires in central California. (Author)

PB-169 385 **Field 4B, 4A**
CFSTI Prices: HC$1.00 MF$0.50
Weather Bureau, Washington, D. C.
FORECASTING DAYTIME TEMPERATURES UTILIZING AVAILABLE SOLAR ENERGY.
Western Region note,
by Huron A. Marmon. Dec 65, 22p WBTN-28-WR-4

Descriptors: (*Weather forecasting, Atmospheric temperature), (*Atmospheric temperature, Weather forecasting), Solar radiation, Heating, Atmosphere.

This study is based on the work of Williams and outlines and tests an objective technique for forecasting daytime temperatures. The purpose is to provide the forecaster with a fast forecast tool without a sacrifice of accuracy. In his paper, Williams refers to the work of Dr. J. Vern Hales and uses the 'Total Insolation Tables' developed by Hales. Williams developed forecasts in the following manner: (a) From Hales' tables the amount of incident solar energy at the top of the atmosphere is interpolated for latitude, date, and hours since sunrise. This value is reduced to the amount of energy available for heating the lower atmosphere by correcting for the albedo of the atmosphere, the albedo of the earth's surface, and the amount of energy used to heat the soil. This paper presents a simplified technique for the temperature forecast expedited by the use of graphs and an equal area mean method. The initial technique is developed for a dry desert region (Las Vegas, Nev.) and a clear sky. A simple method for applying the technique to other locations and sky conditions is then developed.

PB-169 386 **Field 4B**
CFSTI Prices: HC$1.60 MF$0.50
Weather Bureau, Washington, D. C.
700-MB. WARM AIR ADVECTION AS A FORECASTING TOOL FOR MONTANA AND NORTHERN IDAHO.
Western region note,
by Norris E. Woerner. Dec 65, 17p WBTN-25-WR-1

Descriptors: (*Weather forecasting, Air mass analysis), (*Air mass analysis, Weather forecasting), Wind, Mountains, Montana, Idaho.

The purpose of this report is to describe and show synoptic weather patterns and actual cases in which 700-mb. level warm air advection was one of the important tools in forecasting precipitation over Montana and northern Idaho. Because of the mountainous terrain, it is felt that the 700-mb. chart represents more clearly the temperature advection, wind field, and available moisture than either the 850-mb. or 500-mb. charts. In this report three ideal 700-mb. flow patterns with wind direction from the southwest, west, and north will be shown. An actual case will follow each flow pattern and will show the 12-hr. synoptic trend at the surface and 700-mb. levels, usually 12 to 24 hrs. prior to the onset of precipitation. From the 12-hr. synoptic trend, a basic criterion is established to be used as a guide in the forecasting of warm air advection precipitation. (Author)

5. BEHAVIORAL AND SOCIAL SCIENCES

AD-462 339 **Field 5B**
CFSTI Price: HC$2.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
THE APPLICATIONS OF COMPUTERS TO THE APL STORAGE AND RETRIEVAL SYSTEM.
Technical memo.,
by F. L. Kennedy and M. E. Brown. Mar 65, 26p TG-669

Descriptors: (*Computers, Information retrieval), (*Information retrieval, Computers), Tapes, Subject indexing, Programming (Computers), Classification, Data storage systems, Documentation.

Identifiers: IBM 1401, IBM 7090.

An information retrieval system has been developed at the Applied Physics Laboratory that can be used either with an IBM 1401 or a 7090 computer. Details are given on the cataloging procedures, methods of selecting descriptors, and search techniques. Features of the system as applicable to the two computers are compared. (Author)

AD-468 238 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A PROCEDURE FOR REDUCING THE EFFECTS OF SLANTING QUESTIONNAIRE RESPONSES TOWARD SOCIAL ACCEPTABILITY.
Research rept.,
by Robert B. Voas. 15 Sep 56, 12p NSAM-215
NM 001-108-100-17

Descriptors: (*Psychometrics, Personality), (*Personality, Measurement), (*Test construction (Psychology), Reliability), Applied psychology, Social psychology, Analysis of variance, Attitudes, Acceptability.

The Guilford-Zimmerman Temperament Survey and Minnesota Multiphasic Personality Inventory were administered to naval aviation cadets by a method in which both socially acceptable and self-descriptive answers were obtained contiguously. Self-descriptions obtained with socially acceptable responses were significantly less biased towards acceptability in 13 of the 24 scales than were the scores of controls who received these inventories under normal conditions. Thus, allowing Ss to give acceptable answers along with self-descriptions appeared to reduce the bias in the latter. (Author)

AD-468 261 **Field 5I**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A NOTE ON THE RELATIONSHIP OF THE INTERACTION POTENTIAL INVENTORY TO PEER RATINGS OF LEADERSHIP AND OTHER NAVAL AVIATION CADET CRITERIA.
Research rept.,
by George E. Brehman, Jr. 13 Feb 57, 5p
NM 14-02-11-1-21
Prepared in cooperation with Tulane Univ., New Orleans, La.

Descriptors: (*Aviation personnel, Leadership), (*Leadership, Psychometrics), Section, Naval training, Performance (Human), Statistical data.

Conclusions: (1) The relationship between the criteria of part-time work or college leadership and the scales of the Interaction Potential Inventory observed in the present study confirms previous findings and may be regarded as a cross validation

of those findings. (2) Peer ratings of leadership potential are not determined by those aspects of personality tapped by the IPI. (3) The non-significant correlations between the scales of the IPI and the criterion of high school leadership, contrary to previous findings, may be due to the attenuating effects of restriction of range. (4) The presence of a relationship between college subject failure and the IPI and the lack of a similar relationship between the IPI and high school standing may indicate that the IPI is related to a factor, or factors, uniquely determining college success, since high school class standing is known to be a useful predictor of college success. (5) The apparently contradictory findings with regard to pre-flight grade average and college subject failure may be due either to chance or to the possibility of a real difference between the determiners of these two criteria, and replication is therefore indicated. (6) The correlations reported here have been attenuated by the effect of restriction of range, and the true values are at least somewhat larger, as would be indicated by the Penn State findings. (Author)

AD-468 341 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Central Inst. for the Deaf, St. Louis, Mo.
THE DEVELOPMENT AND STANDARDIZATION OF A GROUP TEST FOR CRITICAL FLICKER FREQUENCY.
Research rept.,
by Donald G. Doehring, W. Dixon Ward, and W. Carroll Hixson. 12 Dec 56, 14p
Contract Nonr-1151 (02),
Proj. NR-146-092
NM 001-102-502-4

Descriptors: (*Vision, Test methods), Standardi zation, Visual signals, Thresholds (Physiology), Group dynamics, Performance (Human), Psycho physiology, Frequency, Light pulses.

Identifiers: Flicker fusion tests.

An adequate group test for critical flicker frequency would increase greatly the speed of data collection for this measure. The paper describes the development and standardization of such a test. With this group CFF test, ten subjects at a time can be tested in a total of eight minutes. A method of 'constant descent' is used for stimulus presentation. Production of the stimulus is accomplished by passing the sine wave output of an audio oscillator through a wave-shaping circuit, with the resulting intermittent signal being presented at individual neon lamps. Subjects' threshold judgments are recorded on an operations recorder. The test was administered to 100 naval aviation cadets and 174 naval enlisted men. Subjects were tested in groups of ten and given five trials each. There was no consistent trend in group response level during the five trials, with a maximum variation of 0.5 flashes/sec from the lowest to the highest mean threshold per trial. Intra-individual variability in response over the five trials tended to be relatively small. There was a decrease in intratrial variability from the first to the second trial, and no change in variability over the remainder of the trials, indicating that stability of response is reached after the first trial. The test was shown to discriminate significantly between two different populations, the naval aviation cadets and the naval enlisted men. It was concluded that the test provides a reliable and valid measure of critical flicker frequency. (Author)

AD-473 365 **Field 5I, 5J, 5E**
CFSTI Prices: HC$2.00 MF$0.50
Human Resources Research Office, George Washington Univ., Alexandria, Va.
KEY-WORD-IN-CONTEXT (KWIC) INDEX TO HUMAN RESOURCES RESEARCH OFFICE BIBLIOGRAPHY OF PUBLICATION AS OF 30 JUNE 1965.
Sep 65, 33p

Descriptors: (*Manpower studies, Military require ments), (*Bibliographies, Manpower studies), Indexes, Scientific research, Selection, Training, Psychology, Training devices, Performance (Human), Military requirements, Military personnel, Human engineering.

Identifiers: KWIC index.

A key-word-in-context (KWIC) index has been prepared as an added feature of the 'Human Resources Research Office Bibliography of Publications, as of 30 June 1965' (AD-473 366). Since the KWIC index is an extensive listing, it has been bound as a separated annex for convenience in using it with the 'Bibliography.' The 1965 edition of the 'Bibliography' has been compiled to provide as complete information as is feasible about HumRRO research publications and research by-products. It is arranged in three parts: Part I contains only items issued during FY 1965; Part II is a cumulative listing of all HumRRO published material; Part III presents research by-products. The KWIC index is based upon the information in Part II of the 'Bibliography.' (Author)

AD-473 366 **Field 5I, 5J, 5E**
CFSTI Prices: HC$5.00 MF$1.00
Human Resources Research Office, George Washington Univ., Alexandria, Va.
HUMAN RESOURCES RESEARCH OFFICE BIBLIOGRAPHY OF PUBLICATIONS AS OF 30 JUNE 1965.
Sep 65, 178p
Contract DA-44-188-ARO-2,
Proj. DA-2J024701A712,
Task 01

Descriptors: (*Manpower studies, Military require ments), (*Bibliographies, Manpower studies), Scientific research, Personnel, Training, Psychology, Training devices, Performance (Human), Military requirements, Military personnel, Reports, Documentation, Human engineering.

The cumulative bibliography is divided into three main sections: Part I--a separate listing of FY 1965 publications, arranged chronologically first under code name or type of research other than Task, or under a general section, where titles are grouped as to whether they are HumRRO, military, or professional publications or presentations; Part II--a similarly arranged listing of all material ever published by HumRRO, including the titles in Part I as well as current research indicated by the word 'ongoing'; Part III--a collection of research by-products such as specific training programs, technical manuals, and training items for new equipment. These are briefly described under research code names or general categories, with citation of publications to which they are related. In addition, there are two appendices: Appendix A, listing the numbered series of reports according to both the current and earlier reporting categories; Appendix B, listing the HumRRO research divisions and all Tasks assigned to them that resulted in at least one publication. An author index is provided and, for further aid to the reader, an extensive keyword-incontext (KWIC) index, separately bound (AD-473 365). (Author)

ALO-1 **Field 5A, 15E**
CFSTI Prices: HC$3.00 MF$0.75
Albuquerque Operations Office (AEC), N. Mex.
ALO STANDARD STRUCTURE FOR MANAGERIAL DATA,
by Elmer A. Neuman. Nov 65, 63p

Descriptors: (*Management engineering, Ordnance laboratories), (*Industrial production, Weapon systems).

N66-10758 **Field 5H, 5E**
CFSTI Prices: HC$2.00 MF$0.50
Kansas Univ., Lawrence. Engineering Science Div.
PERFORMANCE OF HUMAN OPERATORS UNDER VARIOUS SYSTEM PARAMETERS,
by H. Akashi and S. Mahmood. Jun 65, 37p
Grant NsG-298
NASA CR-67625

Descriptors: (*Man-machine systems, Performance (Human)), (*Performance (Human), Man-machine systems), Human engineering.

N66-10759 **Field 5I, 5C**
CFSTI Prices: HC$1.00 MF$0.50
Florida Univ., Gainesville. Bureau of Economic and Business Research.
TRENDS IN THE INDUSTRIAL AND OCCUPATIONAL COMPOSITION OF THE LABOR MARKET IN THE CAPE KENNEDY AREA,
by N. G. Keig. 28 May 65, 24p
Grant NsG-507
NASA CR-67624

Descriptors: (*Labor, Florida), (*Rocket research, Labor), Economics, Industries, Space flight.

N66-10886 **Field 5A, 11F, 5J, 6K, +**
CFSTI Prices: HC$1.00 MF$0.50
West Virginia Univ., Morgantown.
ANNUAL STATUS REPORT TO NATIONAL AERONAUTICS AND SPACE ADMINISTRATION,
by J. K. Stewart. 1 Oct 65, 14p
Grant NsG-533
NASA CR-67721

Descriptors: (*Abstracts, Scientific research), (*Space flight, Scientific research), Metallurgy, Psychology, Life support, Radioactivity.

N66-11756 **Field 5C**
CFSTI Prices: HC$2.00 MF$0.50
Florida Univ., Gainesville. Bureau of Economic and Business Research.
ANALYSIS OF SELECTED SERVICE TRADES IN THE CAPE KENNEDY AREA.
Semiannual rept. pt. 2, 1 Mar-30 Jun 65,
by R. H. Blodgett. 7 Jun 65, 27p
Grant NsG-507
NASA CR-67950

Descriptors: (*Economics, Florida).

Identifiers: Cape Kennedy.

N66-11775 **Field 5C**
CFSTI Prices: HC$1.00 MF$0.50
Florida Univ., Gainesville. Bureau of Economic and Business Research.
PROJECTIONS OF THE SIZE AND INDUSTRIAL COMPOSITION OF THE LABOR FORCE IN THE CAPE KENNEDY REGION.
Semiannual rept., Part 5, 1 Mar-30 Jun 65,
by N. G. Keig. 15 Jun 65, 15p
Grant NsG-507
NASA CR-67963

Descriptors: (*Labor, Florida), Population.

Identifiers: Cape Kennedy.

N66-12127 **Field 5H**
CFSTI Prices: HC$6.00 MF$1.25
Biotechnology, Inc., Arlington, Va.
DEVELOPMENT OF TESTS FOR MEASUREMENT OF PRIMARY PERCEPTUAL-MOTOR PERFORMANCE,
by T. G. Andrews, R. F. Dillon, E. A. Fleishman, J. F. Parker, Jr., and R. E. Reilly. Dec 65, 203p
Contract NAS9-2542
NASA CR-335

Descriptors: (*Performance (Human), Space environmental conditions), (*Motor reactions, Space environmental conditions).

N66-12162 Field 5H
CFSTI Prices: HC$2.00 MF$0.50
Dunlap and Associates, Inc., Darien, Conn.
APPARENT MOVEMENT PHENOMENA ON CRT DISPLAYS - THRESHOLD DETERMINATIONS OF APPARENT MOVEMENTS OF PULSED LIGHT SOURCES,
by F. J. Affinlio, H. M. Bowen, L. L. Vallerie andJ. G. Wohl. Dec 65, 31p
Contract NASA-954
NASA CR-342

Descriptors: (*Cathode ray tube screens, Light pulses).

N66-12994 Field 5J
CFSTI Prices: HC$1.00 MF$0.50
Alfred P. Sloan School of Management. Mass. Inst. of Tech., Cambridge.
CONTINUITY AND OPENNESS IN HIGH ENERGY PHYSICS GROUPS,
by H. B. Eyring. Sep 65, 24p Working paper no. 142-65
Grant NsG-235
NASA CR-68303

Descriptors: (*Group dynamics, Behavior), Physics.

PB-169 011 Field 5I
CFSTI Prices: HC$2.00 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
CAREER DEVELOPMENT FOR YEOMAN.
17 Jan 64, 35p

Descriptors: (*Naval training, Naval personnel), (*Naval personnel, Selection), Personnel manage ment, Supervisory personnel, Job analysis.

Identifiers: On-the-job-training.

The Career Development Program for Yeoman became effective in February 1964. It was instituted to provide, on a timely basis, an adequate number of qualified yeomen to properly accomplish the functions of the Yeoman Departments. Only those will be selected for the program who appear to have those qualities which will enable them to assume the duties of the target position (Chief Yeoman, WM-11). Three phases of training must be completed in sequence. Further advancement can be achieved in Phases IV and V. Trainees will be evaluated at stated times.

PB-169 387 Field 5C, 13F
CFSTI Prices: HC$5.00 MF$1.00
Little (Arthur D.), Inc., Cambridge, Mass.
FREIGHT PROBLEMS OF NEW ENGLAND RAILROADS. SECTION I. SUMMARY OF FINDINGS AND IMPLICATIONS FOR FURTHER STUDY. SECTION 2. THE NEW ENGLAND RAILROAD STUDY: RAIL FREIGHT TRAFFIC PATTERNS (AN ABRIDGED VERSION),
by Edward S. Prentice. Feb 66, 197p

Descriptors: (*Railroads, Cargo), (*Cargo, Railroads), Traffic, Economics, Statistical data, Transportation.

Identifiers: New England railroads.

PB-169 397 Field 5C, 5A, 15E
CFSTI Prices: HC$3.00 MF$0.50
National Planning Association, Washington, D.C. Center for Economic Projections.
COMMUNITY READJUSTMENT TO REDUCED DEFENSE SPENDING. CASE STUDIES OF POTENTIAL IMPACT ON SEATTLE-TACOMA, BALTIMORE AND NEW LONDON-GROTON-NORWICH.
Summary rept.
Dec 65, 56p
Contract ACDA/E-57
See also AD-169 398.

Descriptors: (*Armed forces budgets, Urban areas), (*Economics, Disarmament), Labor, Arms control, Industries, Maryland, Connecticut, Washington (State).

The study is concerned specifically with policy -- the policies that may be needed to facilitate adjustment to arms reductions and the policies that may be needed to mitigate the hardships that will persist until the adjustment can be completed. The most severe case concerning future arms reduction considered in this study assumes that there will be a cutback of $18 billion in direct defense expenditures between 1965 and 1970, with an accompanying loss of nearly two million defense jobs. However, for the same period a $220 billion increase in national output and eight million net additional jobs will be required if there is to be adequate purchasing power to maintain reasonably full employment of both a growing labor force and plant capacity. Comparing the two pairs of figures suggests that, on an overall basis, the economic problems created by arms reduction are relatively small compared to the problems which must be faced even if arms reduction does not occur. (Author)

PB-169 398 Field 5C, 5A, 15E
CFSTI Prices: HC$6.00 MF$1.50
National Planning Association, Washington, D.C. Center for Economic Projections.
COMMUNITY READJUSTMENT TO REDUCED DEFENSE SPENDING. CASE STUDIES OF POTENTIAL IMPACT ON SEATTLE-TACOMA, BALTIMORE AND NEW LONDON-GROTON-NORWICH.
Final rept.
Dec 65, 261p
Contract ACDA/E-57
See also PB-169 397.

Descriptors: (*Armed forces budgets, Urban areas), (*Economics, Disarmament), Labor, Arms control, Industries, Maryland, Connecticut, Washington (State).

Contents: Purposes, assumptions, and organization of study; national economic setting; subnational setting; employment dislocation in three metropolitan areas under several arms reduction assumptions; review of selected past economic readjustment experiences; policies, programs and administrative machinery for meeting regional readjustment problems at the subnational level; community perspective on impact problems and solutions; policies and programs for meeting community dislocation problems caused by defense cutbacks; general policy guidelines for regional readjustment to arms reduction.

PB-169 399 Field 5C, 5A, 15E
CFSTI Prices: HC$4.00 MF$1.00
National Planning Association, Washington, D.C. Center for Economic Projections.
COMMUNITY READJUSTMENT TO REDUCED DEFENSE SPENDING. CASE STUDIES OF POTENTIAL IMPACT ON SEATTLE-TACOMA, BALTIMORE AND NEW LONDON-GROTON-NORWICH. APPENDIX I. DESCRIPTION OF ARMS REDUCTION ASSUMPTIONS AND IMPACT OF DEFENSE DEPARTMENT EXPENDITURES ON NATIONAL AND THREE METROPOLITAN AREAS. APPENDIX II. SURVEY METHODOLOGY AND TABULATED RESULTS. APPENDIX III. TABULAR REVIEW OF SELECTED PAST COMMUNITY ECONOMIC READJUSTMENT EXPERIENCES.
Dec 65, 142p
Contract ACDA/E-57
See also PB-169 397, PB-169 398.

Descriptors: (*Armed forces budgets, Urban areas), (*Economics, Disarmament), Labor, Arms control, Industries, Maryland, Connecticut, Washington (State).

PB-169 400 Field 5E, 5A, 15E
CFSTI Prices: HC$3.00 MF$0.75
National Planning Association, Washington, D.C. Center for Economic Projections.
COMMUNITY READJUSTMENT TO REDUCED DEFENSE SPENDING. CASE STUDIES OF POTENTIAL IMPACT ON SEATTLE-TACOMA, BALTIMORE AND NEW LONDON-GROTON-NORWICH. APPENDIX IV. MONOGRAPH: BALTIMORE STANDARD METROPOLITAN STATISTICAL AREA AND HARFORD COUNTY.
Dec 65, 78p
Contract ACDA/E-57
See also AD-169 397, AD-169 398.

Descriptors: (*Armed forces budgets, Urban areas), (*Economics, Disarmament), Labor, Arms control, Industries, Maryland.

The diversified economy of the Baltimore Standard Metropolitan Statistical Area (SMSA) and Harford County expanded significantly over the 1950-60 decade and is expected to continue growing through 1970. Defense activity in the area acts as a catalyst to the rate of expansion, judged from the standpoint of employment, population, and income. There has been little progress in developing for the SMSA effective policies or programs for meeting dislocation problems resulting from defense cutbacks. The possible displacement of workers through defense cutbacks has not been given extensive consideration by the institutions of the area, or even by business or organizations which are direct recipients of the Department of Defense contract awards. Fortunately, industry in the SMSA is so diversified that when employment is declining in certain industries, it is usually rising in others. In recent years, this has eased severity of the dislocation problem. A large scale defense cutback situation would probably be more difficult in terms of the number of defense dislocated workers who could not find alternative jobs - defense or nondefense. (Author)

PB-169 401 Field 5C, 5A, 15E
CFSTI Prices: HC$2.00 MF$0.50
National Planning Association, Washington, D.C. Center for Economic Projections.
COMMUNITY READJUSTMENT TO REDUCED DEFENSE SPENDING. CASE STUDIES OF POTENTIAL IMPACT ON SEATTLE-TACOMA BALTIMORE AND NEW LONDONGROTON-NORWICH. APPENDIX IV. MONOGRAPH: NEW LONDON-GROTON-NORWICH STANDARD METROPOLITAN STATISTICAL AREAS.
Dec 65, 47p
Contract ACDA/E-57
See also AD-169 397, AD-169 398.

Descriptors: (*Armed forces budgets, Urban areas), (*Economics, Disarmament), Labor, Arms control, Industries, Submarines, Connecticut.

The economy of the New London-Groton-Norwich SMSA (Standard Metropolitan Statistical Area) during the last 12 years has undergone a significant change almost exclusively attributable to the presence of the transportation equipment industry (submarine manufacturing). The SMSA's population between 1950-60 grew by 27.4%. Between 1960-64 the population of the area grew 20.3%, while employment over the same period increased by 34.2%. It is clear that defense production is concentrated in this SMSA to a greater extent than in most SMSAs. This concentration in turn has produced a concentration of numerous highly skilled and specialized personnel (engineers, draftsmen, technicians, etc.). In the light of their specializations and the nature of the work in which they are engaged, their absorption by other manufacturing outlets in the event of a cutback is highly problematical. This is especially true since the manufacturing base of the SMSA is very narrow, leaving the area with a very low absorptive capacity.(Author)

PB-169 402 Field 5C, 5A, 15E
CFSTI Prices: HC$3.00 MF$0.75
National Planning Association, Washington, D.C. Center for Economic Projections.
COMMUNITY READJUSTMENT TO REDUCED DEFENSE SPENDING. CASE STUDIES OF POTENTIAL IMPACT ON SEATTLE-TACOMA, BALTIMORE AND NEW LONDON-GROTON-NORWICH. APPENDIX IV. MONOGRAPH: SEATTLE-TACOMA STANDARD METROPOLITAN STATISTICAL AREAS.
Dec 65, 87p
Contract ACDA/E-57
See also AD-169 397, AD-169 398.

Descriptors: (*Armed forces budgets, Urban areas), (*Economics, Disarmament), Labor, Arms control, Industries, Washington (State).

At the present time few specific plans or policies exist in the Seattle and Tacoma Standard Metropolitan Statistical Areas to meet defense cutbacks. The one government agency that has established specific plans is the Washington State Employment Security Department. Although other government organizations interviewed were aware of the need to diversify the Seattle-Tacoma area economy to help alleviate the impact of defense reductions, no specific plans, policies, or programs have been implemented. It is apparent, however, that certain government agencies could serve a productive role in helping to minimize the economic problems caused by defense cutbacks. These organizations include the Washington State Legislative Council, the Washington State Department of Commerce and Economic Development, the Mayor's Office in Seattle, and the City Manager in Tacoma. (Author)

PB-169 405 Field 5B
CFSTI Prices: HC$5.00 MF$1.00
Information Dynamics Corp., Reading, Mass.
A SERIALS DATA PROGRAM FOR SCIENCE AND TECHNOLOGY. RESULTS OF A FEASIBILITY STUDY.
Final rept.,
by William A. Creager and David E. Sparks. 1965, 188p IDC-8521
Contract NSF-C-413

Descriptors: (*Information retrieval, Periodicals), (*Periodicals, Information retrieval), (*Documentation, Periodicals), (*Technical information centers, Feasibility studies), Experimental design, Systems engineering, Operations research, Economics.

Identifiers: Serials data program, Serials.

This report presents the results of a study of the feasibility of establishing a continuing national inventory of the world's scientific and technical serials. The major technical, operational, and economic factors involved in the implementation and operation of such a Serials Data Program have been examined. The basic parameters of a Serials Data Program have been operationally defined and analyzed. These parameters are: (1) program scope, (2) program objectives, (3) prospective users, (4) possible services and products, (5) input data required, and (6) available sources of data. Guiding principles and a general approach to program implementation and operation have been formulated and are presented. Three major principles of program feasibility are identified which involve: (1) the file dependency of the program, (2) the paramount significance of achieving basic file control, and (3) the organization of the data to be collected. Possible procedural strategies for program operation, along with major methodological considerations and system requirements are identified and discussed. A suggested procedural strategy is described. Estimates of the cost to establish and operate a Serials Data Program are presented and an approach to assessing benefit values is set forth. General observations and conclusions related to the various aspects of program feasibility are presented. (Author)

6. BIOLOGICAL AND MEDICAL SCIENCES

AD-466 647 Field 6A
CFSTI Prices: HC$1.00 MF$0.50
Colorado Univ., Boulder. Dept. of Chemistry.
ASCORBIC ACID, BIOLOGICAL FUNCTION AND CHEMISTRY.
Final rept.,
by E. Bell, N. Levandoski, and Bert M. Tolbert.
30 Jun 65, 12p
Contract DA-49-193-MD-2611
Prepared in cooperation with Fitzsimons Medical Nutritional Lab., Denver, Colo.

Descriptors: (*Ascorbic acid, Biochemistry), Oxidation, Tritiated compounds, Synthesis (Chemistry), Mass spectroscopy, Nuclear magnetic resonance, Enzymes.

Identifiers: Dehydroascorbic acid.

The objective of this work was to initiate a study on the biochemistry of ascorbic acid. Two major areas were covered. (1) The sequence of events and chemical nature of the oxidation of ascorbic acid (AsH2) to monodehydroascorbic acid (AsH.) to dehydroascorbic acid (dAs); and (2) Identification of the metabolically active forms of vitamin C and their role on an enzymic level.

AD-467 571 Field 6R
CFSTI Prices: HC$3.60 MF$0.50
Cincinnati Univ., Ohio. Coll. of Medicine.
METABOLIC CHANGES IN HUMANS FOLLOWING TOTAL BODY IRRADIATION.
Annual rept., 1 May 63-29 Feb 64,
by Eugene L. Saenger, Ben I. Friedman, James G. Kereiakes, and Harold Perry. 29 Feb 64, 35p
Contract DA-49-146-XZ-029,
Proj. DA-A4c-03-009
DASA 1633,
N65 31693

Descriptors: (*Whole body irradiation, Metabolism), (*Radiation effects, Metabolism), Immunology, Blood counts, Gamma globulin, Bone marrow, Radiological dosage, Nucleosides, Chromosomes, Radiation injuries, Excretion.

The studies are designed to obtain information which is necessary to estimate combat effectiveness of troops and to develop methods of diagnosis, prognosis, prophylaxis and treatment of radiation injury. At the present time parameters of active investigation are clinical findings, hematologic effects, profile scores, miscellaneous laboratory tests, deoxycytidine excretion in the urine, xanthurenic acid excretion in the urine, chromosome changes in leucocytes, immunologic studies and the use of autologous bone marrow. Six patients were given from 149r to 231r (100-150 rad) total body irradiation from a Co60 source. Only one of the patients had prodromal nausea and vomiting with nausea lasting 48 hours. The lowest hematologic values were found 25 to 35 days after irradiation. Deoxcytidine was found in increased amounts in the urine from patients after total body irradiation. In rats much larger amounts were found in the urine after 500r and 800r whole body irradiation than after lesser doses. Studies by Dr. Anthony Luzzio, U.S. Army Research Laboratory, Ft. Knox, Kentucky, indicate there may be an immunologic post irradiation alteration in human gamma globulin antigenicity. Combat effectiveness would be relatively maintained with an exposure up to 200 rad, though a second exposure would result in significant troop ineffectiveness. (Author)

AD-467 976 Field 6S, 5J
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE ROLE OF VESTIBULAR NYSTAGMIS IN THE VISUAL PERCEPTION OF A MOVING TARGET IN THE DARK,
by Ashton Graybiel, Brant Clark, KennethMacCorquodale, Dorothy I. Hupp and Louis Iverson.
14 Jan 46, 9p Research rept. RR-5, NSAM-406
Proj. X-148 (Av-4-3)

Descriptors: (*Nystagmus, Visual perception), (*Illusions, Nystagmus), Aviation medicine, Vestibular apparatus, Motion, Simulation, Rotation, Acceleration, Deceleration, Vertigo, Night flight.

Six well-trained subjects reported their visual perceptions both during and following rotation while observing a moving target in the dark and in a lighted room. The subjects were rotated at speeds varying from 2 to 15 rpm both to the right and left, while the target described a circular path 2 meters distant and 15 degrees above the level of the subjects' eyes. The subjects were asked to give a qualitative description of their own sensations of rotation and of the apparent movement of the model plane during and following rotation. When a subject was accelerated to 15 rpm in the dark, there was a rapid displacement of the target in the opposite direction, although, at the same time, as a result of nystagmus the target appeared motionless. This paradox made it necessary for the subjects to distinguish between rate of motion and amount of displacement. As the target went by on successive rotations, it appeared to pass more rapidly until, after approximately 30 seconds, the subject felt himself to be stationary while the target rotated rapidly around him. Similar results occurred at slower speeds of rotation. The post-rotation phenomena were stronger, since the deceleration was more rapid. These phenomena which did not occur in a lighted room can be considered as a summation of the effects of real motion of the target, vestibular nystagmus, and the subjects' sensations of their own motion.

AD-467 978 Field 6S, 5J
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE ILLUSORY PERCEPTION OF MOVEMENT CAUSED BY ANGULAR ACCELERATION AND BY CENTRIFUGAL FORCE DURING FLIGHT. I. METHODOLOGY AND PRELIMINARY RESULTS,
by Ashton Graybiel, Brant Clark andK. MacCorquodale. 25 Mar 46, 10p Research rept. RR-6, NSAM-407
Proj. S-148 (Av-4-3)

Descriptors: (*Nystagmus, Visual perception), (*Visual perception, Flight), Acceleration, Tolerance, Stress (Physiology), Aviation medicine, Night flight, Illusions, Pilots, Vestibular apparatus, Psychophysiology, Turning flight.

Identifiers: Autokinetic effects.

Experiments were carried out on three subjects using five basic maneuvers in addition to control periods of straight and level flight. It was shown that angular acceleration and g during flight induce illusory perceptions of motion and displacement of an objectively motionless object. The magnitude of the illusory effects may be great, the fixation object appearing to be displaced as much as 60 degrees from its actual position. The significance of this finding for aviation is evident. The method is adaptable to a number of types of studies concerned with the influence of angular acceleration and g on visual perception. (Author)

AD-467 980 Field 6S, 5J
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE ILLUSORY PERCEPTION OF MOVEMENT CAUSED BY ANGULAR ACCELERATION AND BY CENTRIFUGAL FORCE DURING FLIGHT.

III. HABITUATION AND TECHNIQUE OF ASSUMING THE TURN AS FACTORS IN ILLUSORY PERCEPTION,
by Brant Clark, Ashton Graybiel and K. MacCorquodale. 1 Jul 46, 14p Research rept. RR-11
Proj. X-148 (Av-4-3)

Descriptors: (*Nystagmus, Visual perception), (*Visual perception, Flight), Acceleration tolerance, Aviation medicine, Stress (Physiology), Turning flight, Psychophysiology, Illusions, Night flight, Vestibular apparatus.

Identifiers: Habituation.

The chief purposes of the study were: (1) to compare the illusions observed during two methods of executing a turn, and (2) to determine whether habituation occurred during the experiment. In the first series (AD-467 978) the turns were carried out by using a constant power setting and changing the angle of attack of the wing to maintain the proper altitude; this resulted in a coincident change of magnitude and direction of the g force on the subject. In the second series (AD-468 152) the angle of attack was held constant while the power was increased to maintain altitude; this resulted in a change in magnitude without a change in direction of the g force. The third series was a repetition of the first for three selected angles of bank. There was no consistent difference in the pattern of illusory response observed in the three series. This was true of the amount of illusory motion and displacement, the time relations, and the sequence of events. Therefore, there was no significant evidence of any difference in the illusory perceptions during the two types of banks nor was there evidence of habituation within the limits of this experiment. (Author)

AD-468 310 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A STUDY OF EARLY GREYOUT THRESHOLD AS AN INDICATOR OF HUMAN TOLERANCE TO POSITIVE RADIAL ACCELERATORY FORCE.
Research rept.,
by J. J. Zarriello, Mary E. Norsworthy, and H. R. Bower. 10 Jul 58, 18p
NM 11-02-11-1-1

Descriptors: (*Acceleration tolerance, Visual perception), Thresholds (Physiology), Blackout (Physiology), Cardiovascular system, Flight crews, Experimental data, Torque, Stress (Physiology).

Identifiers: Centrifugation (Human).

The purpose of this study was to investigate the relationship under increased positive radial acceleratory force between peripheral light loss and blackout or unconsciousness when the light stimulus is located at 80 degrees in the peripheral field; and to determine whether an 80 degree peripheral light stimulus was an earlier indicator than lights located at 23 degrees in the peripheral field. Under conditions of our experiment, it was found that an 80 degree light stimulus was an earlier indicator than the 23 degree light for an endpoint of greyout in regard to magnitude of the G force. The time spread between onset of greyout (80 degree light loss) and onset of blackout or unconsciousness was determined, and this time spread was found to be slightly increased when compared to the use of a 23 degree light as an endpoint of greyout. The peripheral light loss has limited usefulness as an early indicator for the onset of critical symptoms of blackout or unconsciousness. (Author)

AD-469 020 **Field 6R, 6**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
A PERSISTENT METABOLIC EFFECT OF X RAYS OR NEUTRONS,
by Garold K. Osborn, Dave C. Jones, and Donald J. Kimeldorf. 1 Jul 65, 29p USNRDL-TR-874
NAVMED MR005.08-5201-2

Descriptors: (*Radiation effects, Metabolism), (*Metabolism, Radiation effects), Aging (Physiology), Growth, Rats, Neutrons, X rays.

Long-term studies of body weight and the consumption of food, water and oxygen were carried out on male, Sprague-Dawley rats irradiated as young adults (101 days of age) with 430 or 680 rads of x-rays or with 230 or 320 rads of fast neutrons. In comparison to simultaneously aging nonirradiated littermate controls, the body weight deficit attained during the first month postirradiation was never recovered and became even greater with advancing age. The size of this weight deficit was a function of dose and was greater per rad in the neutron-exposed animals. When persistent decrements in the consumption of oxygen and of food were prorated per unit of metabolic size, the differences from controls were no longer significant. The principal effect upon water consumption appeared to be an acceleration in time of the elevated water consumption normally seen late in life in nonirradiated rats. These results demonstrated permanent effects upon the functional state of animals irradiated early in life with a single dose of ionizing radiation in the sublethal or lethal (30-day) range. It is as though there is a portion of the irradiated animal missing by the end of the acute period following exposure; a portion which is never regained and which accounts for a major part of the metabolic decrement seen throughout most of the remainder of life. (Author)

BNWL-165 **Field 6R, 18G**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
EVALUATION OF RADIOLOGICAL CONDITIONS IN THE VICINITY OF HANFORD, JANUARY-JUNE 1965,
by R. H. Wilson. Nov 65, 29p
Contract AT (45-1)-1830

Descriptors: (*Radiological contamination, Environmental tests).

CONF 551-3 **Field 6C, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Pavia Univ. (Italy). Istituto di Genetica.
VALUE OF INDUCE 7 Y 9TATIONS FOR QUANTITA- TIVE CHARACTERS IN PLANT BREEDING,
by R. E. Scossiroli. 1964, 23p
Contract AT (30-1)-2466
Prepared for presentation at technical meeting on the use of induced mutations in plant breeding programs, Rome, 25 May-1 Jun 64.

Descriptors: (*Mutations, Plants (Botany)), (*Plants (Botany), Radiation effects).

CONF-651024 **Field 6H, 18B, 6R**
CFSTI Prices: HC$6.00 MF$1.25
Division of Isotopes Development (AEC), Washington, D. C.
RADIATION PASTEURIZATION OF FOODS.
1965. 210p
Prepared in cooperation with Division of Biology and Medicine (AEC), Washington, D. C. Prepared for presentation at annual Contractors Meeting (5th), October 20-21, 1965.

Descriptors: (*Irradiated foods, Nuclear industrial applications), (*Food, Pasteurization).

N66-10552 **Field 6K**
CFSTI Prices: HC$2.00 MF$0.50
General Dynamics/Astronautics, San Diego, Calif.
WATER MANAGEMENT SUBSYSTEM SPECIFICATION FOR SPACE FLIGHTS OF EXTENDED TIME PERIODS. LIFE SUPPORT SYSTEM FOR SPACE FLIGHTS OF EXTENDED TIME PERIODS,
by J. A. Steele. 30 Nov 65, 31p GD/A-64-26211, Rev. A
Contract NAS1-2934
NASA CR-67600

Descriptors: (*Life support, Manned spacecraft), Water.

N66-10773 **Field 6M, 6F**
CFSTI Prices: HC$3.00 MF$0.50
Oregon State Univ., Corvallis.
MICROORGANISM STUDY PROGRESS REPORT,
by W. B. Bollen. 20 Aug 65, 53p
Contract NAS7-100
NASA CR-67686
Report prepared for Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Rept. no. JPL 950 783.

Descriptors: (*Corynebacterium, Soils), Culture media.

N66-10938 **Field 6K**
CFSTI Prices: HC$7.00 MF$2.00
Hamilton Standard Div., United Aircraft Corp., Broad Brook, Conn.
MARS LANDING AND RECONNAISSANCE MISSION ENVIRONMENTAL CONTROL AND LIFE SUPPORT SYSTEM STUDY. VOLUME 2. SUBSYSTEM STUDIES.
Final rept. 15 Jul 63 - 15 Mar 64.
1964, 408p SLS-414-2
Contract NAS9-1701
NASA CR-67935

Descriptors: (*Mars, Soft landings), (*Reconnaissance satellites, Soft landings), (*Life support, Mars).

N66-10939 **Field 6C**
CFSTI Prices: HC$3.00 MF$0.75
Martin Co., Baltimore, Md. Research Inst. for Advanced Studies.
A STUDY OF THE FEASIBILITY OF DETECTING EXTRATERRESTRIAL LIFE BASED ON THE EXCHANGE BETWEEN WATER AND OXYANIONS AND A STUDY OF ENERGY EXCHANGE IN AUTOTROPHIC LIFE.
Final rept.,
by B. Kok. Aug 65, 73p
Contract NASW-1054
NASA CR-67924

Descriptors: (*Space biology, Detection), (*Oxygen, Exchange reactions), (*Exchange reactions, Oxygen), Catalysts, Water.

N66-10956 **Field 6A, 6M**
CFSTI Prices: HC$4.00 MF$0.75
Mississippi State Univ., State College.
SOME OF THE EFFECTS OF THREE AMINO ACIDS ON THE GROWTH OF HYDROGENOMONAS EUTROPHA.
Masters thesis,
by E. E. Blake. Jan 66, 112p
Grant NsG-650
NASA CR-67927

Descriptors: (*Bacteria, Growth), (*Amino acids, Bacteria).

Identifiers: Hydrogenomonas.

N66-11249 **Field 6K**
CFSTI Prices: HC$7.00 MF$1.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.

THERMAL INTEGRATION OF ELECTRICAL POWER AND LIFE SUPPORT SYSTEMS FOR MANNED SPACE STATIONS,
by K. L. Hanson. Nov 65, 324p
Contract NAS3-2799
NASA CR-316

Descriptors: (*Life support, Manned spacecraft), (*Manned spacecraft, Life support).

N66-11669 Field 6A
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Dept. of Biophysics.
REASSOCIATION OF HEMOCYANINS FROM SUBUNIT MIXTURES,
by H. Fernandez-Moran and E. F. J. Van Bruggen. 1965, 17p
Grants NsG-441-63, NIH GM-13243
NASA CR-68034

Descriptors: (*Chromoproteins, Electron microscopy).

Identifiers: Subunit mixtures.

N66-11770 Field 6A
CFSTI Prices: HC$3.00 MF$0.75
Chicago Univ., Ill. Dept. of Biophysics.
MACROMOLECULAR ORGANIZATION OF HEMO- CYANINS AND APOHEMOCYANINS AS REVEALED BY ELECTRON MICROSCOPY,
by H. Fernandez-Moran, M. Ohtsuki, and E. F. J. Van Bruggen. 1964, 62p
Contract AT (11-1)-1344, Grant NsG-441-63
NASA CR-67942
Prepared in cooperation with Natl. Insts. of Health, Public Health Service, Grants PHS-CM-13243, PHS-NB-04267.

Descriptors: (*Chromoproteins, Molecular structure), Arthropods, Mollusca, Blood plasma, Electron microscopy.

N66-12200 Field 6R, 6C
CFSTI Prices: HC$1.00 MF$0.50
Northrop Space Labs., Hawthorne, Calif.
INVESTIGATION OF PEROGNATHUS AS AN EXPERIMENTAL ORGANISM FOR RESEARCH IN SPACE BIOLOGY.
Progress rept, 1 Jul-30 Sep 65,
by J. J. Gambino. 1965, 23p NSL-64-29-8
Contract NAS-812
NASA CR-68217

Descriptors: (*Mice, Space biology), (*Intestines, Radiation effects), Laboratory animals, Histology.

N66-12345 Field 6S
CFSTI Prices: HC$1.00 MF$1.00
National Aeronautics and Space Administration. Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY A CONTINUING BIBLIOGRAPHY WITH INDEXES, OCT. 1965.
Nov 65, 142p NASA-SP-7011/17/

Descriptors: (*Aviation medicine, Bibliographies), (*Bibliographies, Aviation medicine).

N66-12972 Field 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE EFFECTS OF ENVIRONMENTAL TEMPERATURE CHANGES ON THE EKG OF THE SQUIRREL MONKEY / SAIMIRI SCIUREUS/,
by A. Eskin and D. C. Riccio. 12 May 65, 16p
NSAM-926
Contract NASA ORDER R-39
NASA CR-68306

Descriptors: (*Electrocardiography, Temperature), (*Temperature, Electrocordiography), Monkeys.

Identifiers: Saimiri Sciureus.

Patent 3,222,193 Field 6H, 13H
METHOD OF SPRAY DRYING LIQUID FOOD PRODUCTS.
Patent assigned to Agriculture,
by Francis P. Hanrahan. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Dehydrated foods, Preparation), Powders, Drying, Driers (Apparatus), Sprays, Milk, Beverages, Patents.

Identifiers: Spray drying.

Liquid foods such as cottage cheese whey, whole milk, tomato juice, grape-fruit juice and orange juice, may be dried to a free-flowing powder without impairment of nutritive value. The liquid, after conventional preparation, is put in a mixing zone and an insoluble gas is injected into it. It is then spray dried to produce a dry powder.

Patent 3,223,708 Field 6O, 6F
N-DECANOYL TETRAHYDROQUINOLINE.
Patent assigned to Agriculture,
by Robert R. Mod, Evald L. Skau, Sara P. Fore, Frank C. Magne, and Arthur F. Novak. 14 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Germacides, Quinolines), (*Fungicides, Quinolines), (*Quinolines, Antimetabolites), Amides, N-heterocyclic compounds, Polycyclic compounds, Patents.

Identifiers: Decanoyl tetrahydroquinolines.

The subject derivatives of aliphatic acid amides exhibit anti-microbial activity. They are effective against bacteria, yeasts, and molds, many of which are pathogenic. The claimed product is N-decanoyl tetrahydroquinoline.

TID-21357 Field 6F
CFSTI Prices: HC$3.00 MF$0.75
Ohio. Agricultural Experiment Station, Wooster.
BIOCLIMATIC AND SOILS INVESTIGATIONS IN FOREST ENVIRONMENTS. V. SOLAR RADIATION MEASUREMENTS AT NEOTOMA.
by Herbert G. Brown. Aug 64, 59p
Contract AT (11-1)-552

Descriptors: (*Solar radiation, Forestry), (*Plants (Botany), Solar radiation).

TID-21515 Field 6F
CFSTI Prices: HC$4.00 MF$1.25
Ohio State Univ., Columbus. Dept. of Botany and Plant Pathology.
BIOCLIMATIC AND SOILS INVESTIGATIONS IN FOREST ENVIRONMENTS. III. VEGETATION OF NEOTOMA.
Final rept.,
by Jerry A. Koch. Aug 64, 137p
Contract AT (11-1)-552

Descriptors: (*Forestry, Ecology), (*Ecology, Plants (Botany).

TID-21601 Field 6C, 6R
CFSTI Prices: HC$1.00 MF$0.50
Turku Univ. (Finland).
MUTATION RATES AT SPECIFIC AUTOSOMAL LOCI IN DIFFERENT SPECIES OF DROSOPHILA.
Final rept. for 1959-1964,
by Aloha Hannah-Alava. 1964, 12p
Contract AT (30-4)-2690

Descriptors: (*Drosophila, Radiation effects), (*Mutations, Drosophila).

TID-22289 Field 6H, 18B
CFSTI Prices: HC$3.00 MF$0.50
Oregon State Univ., Corvallis. Dept. of Food Science and Tech.
EFFECT OF IRRADIATION ON THE MICROBIAL FLORA SURVIVING IRRADIATION PASTEURIZATION OF SEAFOODS,
by R. O. Sinnhuber and J. S. Lee. 26 Apr 65, 70p
Contract AT (04-3)-502

Descriptors: (*Seafood, Microorganisms), (*Irradiated foods, Storage).

UCRL-14505 Field 6E, 6O
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
THE CALCULATION OF TREATMENT SCHEDULES FOR CANCER CHEMOTHERAPY. PART II,
by R. N. Stuart and T. C. Merkle. 7 Dec 65, 26p
Contract W-7405-eng-48

Descriptors: (*Chemotherapeutic agents, Scheduling), (*Cancer, Chemotherapy).

7. CHEMISTRY

AD-459 048 Field 7B, 11B, 14B
CFSTI Price: HC$2.00
Union Carbide Research Inst., Tarrytown, N. Y.
METHODS OF ANALYSIS OF METAL REFRACTORIES. BORIDES, CARBIDES AND NITRIDES OF HAFNIUM NIOBIUM, TANTALUM, TITANIUM AND ZIRCONIUM,
by R. E. Dutton, G. J. McKinley, D. McLean and H. F. Wendt. Feb 65, 28p Technical rept. no. C-29
Contract DA-30-069-ORD-2787, ARPA Order-34-63,
Task 4

Descriptors: (*Refractory materials, Chemical analysis), (*Chemical analysis, Test methods), Borides, Carbides, Nitrides, Refractory metals, Hafnium com pounds, Niobium compounds, Tantalum compounds, Titanium compounds, Zirconium compounds, Impurities, Boron, Carbon, Nitrogen, Oxygen.

The metallurgical program for which this laboratory provides analytical service has been primarily concerned with the borides, carbides, and nitrides of hafnium, niobium, tantalum, titanium, and zirconium. The recent production of purer and more complex materials and the correlation of physical properties and chemical reaction behavior with sample composition have revealed the need for modification and improvement of some of the analytical procedures heretofore used. This report outlines the methods this laboratory uses routinely. Full details of major improvements in technique and new approaches that have evolved are given. (Author)

AD-466 907 Field 7D
CFSTI Prices: HC$2.00 MF$0.50
Coates Chemical Lab., Louisiana State Univ., Baton Rouge.
COULOSTATIC STUDY OF RESIDUAL OXYGEN IN ELECTRO-CHEMICAL INVESTIGATIONS,
by Frank R. Smith and Paul Delahay. Jun 65, 37p Technical rept. TR-59
Contract Nonr-1575 (04),
Proj. NR-051-258

Descriptors: (*Electrolytic cells, Oxygen), (*Oxygen, Electrochemistry), Impurities,

Concentration (Chemistry), Chemical analysis, Buffers (Chemistry), Nitrogen, Hydrogen, Oxidation-reduction reactions, Mass transfer, Ions, Voltage, Electrodes, Mercury.

Residual oxygen concentrations of about 5 x 10 to the-7th power M were measured in nitrogen- and hydrogen-saturated buffer solutions by the coulostatic method using a hanging mercury drop electrode. Light pre-electrolysis of the buffer solutions was found to cause very little alteration of the measured values but under some conditions the apparent oxygen concentration became much smaller and other phenomena occurred. These phenomena were accentuated when the hydrogen used was strongly deoxygenated. In the region of the first oxygen wave a mass transfer-controlled oxidation was predominant, no oxygen reduction currents being observable, but at much more negative potentials a pseudocapacity was observed, a more or less stable rest potential (having a range of values) being attained in a few seconds almost regardless of the coulostatic charge applied. It is probable that a redox couple is responsible but the occurrence of similar phenomena in two different buffers makes an impurity effect less likely. An explanation in terms of the hydrogen molecule ion, produced in solution as the result of pre-electrolysis, is tentatively suggested. (Author)

ANL-7048 **Field 7B**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
A THERMODYNAMIC STUDY OF THE URANIA-URANIUM SYSTEM,
by R. J. Ackermann, E. G. Rauh andM. S. Chandrasckharaiah. Jul 65, 34p
Contract W-31-109-eng-38

Descriptors: (*Uranium compounds, Dioxides), (*Thermodynamics, Uranium compounds).

ANL-7086 **Field 7A, 13H**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
THE EFFECT OF INTERPARTICLE FORCES ON THE FLUIDIZATION OF FINE PARTICLES,
by Manfred G. Bacrns. Aug 65, 28p
Contract W-31-109-eng-38

Descriptors: (*Fluidized bed processes, Particles), (*Heat transfer, Fluidized bed processes).

DP-972 **Field 7E, 7A**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
ISOLATING AMERICIUM AND CURIUM FROM AL (NO3)3-NaNO3-NO3 SOLUTIONS BY BATCH EXTRACTION WITH TRIBUTYL PHOSPHATE,
by Hugh E. Henry. Aug 63, 23p
Contract AT (07-2)-1

Descriptors: (*Americium, Solvent extraction), (*Curium, Solvent extraction).

DP-985 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
DuPont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
AUTOMATED ANALYSIS OF LITHIUM SOLUTIONS,
by Rufus H. Gaddy. Oct 65, 12p
Contract AT (07-2)-1

Descriptors: (*Chemical analysis, Automatic), (*Lithium, Chemical analysis).

N66-10215 **Field 7C**
CFSTI Prices: HC$5.00 MF$1.25
Rensselaer Polytechnic Inst., Troy, N. Y.
AN INVESTIGATION OF SOME REACTIONS OF ACTIVE NITROGEN.
Doctoral thesis,
by D. R. Safrany. Jun 64, 186p
Grants NsG-100-60, AF-AFOSR-174-63
NASA CR-67884,
AD 620 226

Descriptors: (*Nitrogen, Chemical reactions), Mass spectroscopy.

N66-10652 **Field 7B**
CFSTI Prices: HC$4.00 MF$0.75
Aerojet-General Corp., Azusa, Calif. Chemical and Structural Products Div.
RESEARCH ON PROCESSES FOR UTILIZATION OF LUNAR RESOURCES.
Final rept., 22 Apr. 63-15 Jul. 65,
by R. L. Beegle, Jr., G. A. Guter, F. E. Miller, andS. D. Rosenberg. Aug 65, 118p Rept. no. 3049
Contract NAS7-225
NASA CR-67821

Descriptors: (*Igneous rock, Reduction (Chemistry), (*Carbon, Catalysts), Hydrogen, Methanes, Carbon compounds, Monoxides.

N66-10757 **Field 7E**
CFSTI Prices: HC$3.00 MF$0.75
DuPont De Nemours, E. I. and Co., Inc., Wilmington, Del. Engineering Physics Lab.
THE FORMATION AND PROPERTIES OF CERTAIN COMETARY SPECIES,
by G. J. Pontrelli. Jan 65, 78p
Contract NASw-707
NASA CR-67626

Descriptors: (*Acetylenes, Photochemistry), Comets.

N66-11689 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. School of Medicine.
A SUBALGOL PROGRAM FOR CALCULATION OF MOLECULAR COMPOSITIONAL FORMULAS FROM MASS SPECTRAL DATA.
Interim rept.,
by J. Lederberg and M. Wightman. 26 Jun 64, 18p
Grants NSG-81-60, NIH NB-04270-01
NASA CR-60171

Descriptors: (*Molecular weight, Determination), Mass spectroscopy, Programming (Computers).

Identifiers: IBM-7090.

N66-11750 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
New York Univ., N. Y.
NITRIC OXIDE PHOTOLYSIS.
Final rept.,
by H. A. Taylor. 31 Aug 65, 4p
Grant NsG-217-62
NASA CR-68048

Descriptors: (*Nitrogen compounds, Photochemistry), (*Oxides, Photochemistry), Mass spectroscopy, Chromatographic analysis.

Identifiers: Nitric oxide.

N66-11766 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Notre Dame Univ., Ind. Dept. of Chemistry.
SOME SELECTED SCHIFF-BASE EXCHANGE REACTIONS,
by J. V. Crivello, G. F. Dalelio, and T. Kurosaki. 1965, 7p
Grant NsG-339
NASA CR-67990
Prepared for presentation at Annual Meeting of Indiana Academy of Science, 7-9 Oct 65.

Descriptors: (*Exchange reaction, Amines), Aldehydes, Ketones, Ion exchange.

Identifiers: Schiff bases, Carbonyl.

N66-11767 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
STUDY OF GROWTH PARAMETERS FOR REFRACTORY CARBIDE SINGLE CRYSTALS.
Quarterly status rept. no. 6, 1 Jun-1 Sep 65,
by R. W. Bartlett, E. Carr, W. E. Nelson, andR. Sedlacek. 28 Sep 65, 23p
Contract NASr-49/19
NASA CR-68008

Descriptors: (*Single crystals, Growth), Tantalum compounds, Carbides, Refractory metals.

N66-12872 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
G. M. Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
CARBON DIOXIDE DISSOCIATION RATES BEHIND SHOCK WAVES.
Final rept., Mar 63-Mar 64.
Sep 64, 33p TR-64-49
Contract NAS7-217
NASA CR-68229

Descriptors: (*Carbon dioxide, Dissociation), (*Shock waves, Dissociation).

N66-13082 **Field 7C**
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
CENTRAL POTENTIALS FOR POLYATOMIC MOLECULES. A SURVEY OF MORSE POTENTIALS DETERMINED FROM VISCOSITY AND THE SECOND VIRIAL COEFFICIENT,
by S. Carra and D. D. Konowalow. 1 Jun 65, 14p
WIS-TCI-99
Contract AF 33/657/-7311, Grant NsG-275-62
NASA CR-68409

Descriptors: (*Hydrocarbons, Viscosity).

Identifiers: Virial theorem, Molecular interaction, Morse potential.

NAS-NS-3002 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
Florida State Univ., Tallahassee.
RADIOCHEMISTRY OF ARSENIC.
Nuclear Science series of National Academy of Sciences-National Research Council, Washington, D. C. Committee on Nuclear Science,
by Harold C. Beard and J. G. Cuninghame. Jan 60, 43p
Prepared in cooperation with AEC Research Est., Harwell (England).

Descriptors: (*Arsenic, Radiochemistry), (*Radio chemistry, Arsenic).

NBL-228 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
New Brunswick Lab. (AEC), N. J.
SPECTROPHOTOMETRIC DETERMINATION OF GALLIUM IN PLUTONIUM-GALLIUM ALLOY,
by C. E. Pietri and A. W. Wenzel. Nov 65, 8p

Descriptors: (*Plutonium alloys, Gallium alloys), (*Gallium alloys, Spectrophotometers).

ORNL-3830 **Field 7A, 7E, 18C, 18G**
CFSTI Prices: HC$7.00 MF$1.50
Oak Ridge National Lab., Tenn.
CHEMICAL TECHNOLOGY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING MAY 31, 1965.
Nov 65, 326p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel processing, Chemical engineering), (*Nulear engineering, Reports).

ORNL-3863 **Field 7A, 7E, 18G**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
PILOT PLANT DEMONSTRATION OF THE DECONTAMINATION OF LOW-LEVEL PROCESS WASTES BY A RECYCLE SCAVENGING-PRECIPITATION IONEXCHANGE PROCESS.
Dec 65, 89p
Contract W-7405-eng-26

Descriptors: (*Radioactive waste, Decontamination), (*Ion exchange, Radioactive waste).

Patent 3,219,706 **Field 7C, 19A, 21I**
NITROALKYLAMINES.
Patent assigned to Navy,
by Mortimer J. Kamlet and Joseph C. Dacons. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Organic nitrogen compounds, Synthesis (Chemistry)), (*Explosive materials, Organic nitrogen compounds)), (*Propellants, Organic nitrogen compounds)), Amines, Potassium compounds, Bromine compounds, Ammonium compounds, Bromides, Patents.

Identifiers: Bromo dinitroethyl ammonium bromide, Dimethyl dinitroethylamine, Dinitro ethulamines, Potassium dimethyl dinitroethylamines.

The compounds are useful as high explosives and propellants and as monomers in the preparation of energetic polymer systems. One compound, 2-bromo-2, 2-dinitro ethylammonium bromide is prepared by reacting an etheral suspension of 2,2-dinitroethylamine with elemental bromine. Other compounds specifically claimed are N,N-dimethyl- 2,2-dinitroethyl-amine, potassium-N,N-dimethyl- 2,2-dinitroethylamine, and 2,2-dinitroethylamine.

Patent 3,223,725 **Field 7C, 19A**
PREPARATION OF ESTERS THROUGH THE USE OF FRIEDEL-CRAFTS CATALYSTS.
Patent assigned to Navy,
by Marion E. Hill. 14 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Explosive materials, Preparation), (*Esters, Synthesis (Chemistry)), (*Friedel-crafts reactions, Esters), Organic nitrogen compounds, Succinates, Nitrobenzenes, Benzoates, Fatty acid esters, Acetates, Propellants, Shaped charges, Fragmentation ammunition, Patents.

Identifiers: Butyrates, Fumarates, Itaconates.

The products are powerful explosives. The esters of aliphatic alcohols are prepared by reacting a primary, saturated lower aliphatic alcohol substituted in the beta position with a substituent from the group consisting of N02, C1, Br, and F with an acid chloride in the presence of a metal halide catalyst. Novel compounds so prepared are Bis-2,2-nitroethyl itaconate; bis-2,2, 2-trinitroethyl fumarate; 2,2,2-trinitroethyl succinate; 2,2,2-trinitroethyl 3,5-dinitrobenzoate; 2,2,2-trinitroethyl 2,4,6-trinitro-benzoate; 2,2-dinitropropyl 4,4,4-trinitrobutyrate; bis-2,2-dinitropropyl fumarate; 2,2-dinitropropyl n-trinitroethyl nitroaminoacetate; and 2,2,2-tribromoethyl 3,5-dinitrobenzoate.

Patent 3,226,302 **Field 7A, 6A, 6O, 6M**
PRODUCTION OF BETA-CAROTENE.
Patent assigned to Agriculture.
by Alex Ciegler. 28 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Carotinoids, Production), (*Fungi, Culture media), (*Organic pigments, Biosynthesis), Dyes, Vitamin A, Tissue textracts, Yeasts, Patents.

Identifiers: Blakeslea trispora, Fermentation, Food colorings, Vitamin precursors.

The invention involves a method of greatly improving the production of beta-carotene by the mixed mating strains of Blakeslea trispora in a beta-carotene-producing fermentation medium, comprising adding to the medium at the beginning of the fermentation a member selected from the group consisting of (a) from 1 to 2 percent by weight, based on the medium, of dry pentane-hexane extracted, fat-free mycelia of an organism selected from the group consisting of Blakeslea trispora, Aspergillus clavatus, Aspergillus niger, Rhizopus acetoinus, Mucor fansseni, Rhizopus chinensis, Blakeslea circuirans, Choanephora infudibulifera, Choanephora cucurbitarum, Rhodotorule glutinus, Rhodotorula rubra, Rhodoturula sannei, and Saccharomyces cerevissiae, and (b) a concentrate of the entire aqueous extract of said fat-free mycelia containing the water-solubles from 1 gm. of said fat-free mycelia, and fermenting the resulting culture medium under aerobic conditions and at 28C. for 6 days. (Author)

PB-169 229 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
DOSAGE DU CHLORE ET DU FLUOR PAR SPECTROGRAPHIE D'EMISSION EN ATMOSPHERE INERTE (Spectrographic Determination of Chlorine and Fluorine).
Doctoral thesis in French,
by Ghislaine Contamin. 1965, 36p CEA-R-2826
Text in French; Attached Summary in English.

Descriptors: (*Chlorine, Atomic spectroscopy), (*Fluorine, Atomic spectroscopy), Excitation, Ionization, Dissociation, Gas discharges, France.

Experimental conditions have been investigated in order to obtain the highest sensitivity in spectrographic determination of chlorine and fluorine using the Fassel method of excitation in an inert atmosphere. The influence of the nature of the atmosphere, of the discharge conditions and of the matrix material has been investigated. The following results have been established: 1. chlorine determination is definitely possible: a working curve has been drawn between 10 micro-g and 100 micro-g, the detection limit being around 5 micro-g. 2. fluourine determination is not satisfactory: the detection limit is still of the order of 80 micro-g. The best operating conditions have been defined for both elements. (Author)

PB-169 231 **Field 7D, 20J**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DE L'INTERACTION DE PAIRE DANS QUELQUES METAUZ NORMAUX (A Calculation of the Pair-Interaction Function in Some Normal Metals.)
Doctoral thesis in French,
by Robert Pick. 9 Jun 65, 79p CEA-R-2820
Text in French; Attached summary in English.

Descriptors: (*Metals, Atomic structure), (*Atomic structure, Perturbation theory), Wave functions, Quantum mechanics, Atomic energy levels, Electrons, Lithium, Sodium, Potassium, Aluminum, Crystal structure, Phonons, France.

The pair interaction function has been derived for the following metals: Li, Na, K, Al. It is obtained via a second order perturbation expansion of the wave functions of the conduction electrons using a self-consistent pseudo-potential. Exchange and correlations between those electrons have been ignored. Such an interaction is only valid at constant volume and depends on a single experimental parameter, namely the ionic volume. Its main features are a pronounced minimum in the vicinity of the nearest neighbours, expecially marked in alkaline metals, and an asymptotic decrease. This interaction gives the correct crystalline structure of these metals at absolute zero as well as a good approximation of the phonon spectrum of the alkalines. The validity of the perturbation technique is discussed. We prove that the pair interaction function is correctly given to second order in the pseudo-potential despite the various approximations and errors involved by such a method.

RFP-414 **Field 7D, 7B, 7E**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
ANALYSIS OF AMERICIUM FOR PLUTONIUM, THORIUM AND RARE EARTH IMPURITIES BY EMISSION SPECTROSCOPY,
by H. N. Barton. 27 Oct 65, 25p
Contract AT (29-1)-1106

Descriptors: (*Spectroscopy, Americium), (*Americium, Impurities).

TIM-900 **Field 7B, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Aircraft Nuclear Engine Lab.
STATUS OF METHODS FOR DETERMINING CARBON, OXYGEN AND NITROGEN IN ALKALI METALS,
by E. W. Nobart. 1 Apr 65, 25p
Contract AT (30-1)-2789

Descriptors: (*Alkali metals, Gases), (*Chemical analysis, Alkali metals).

TIM-904 **Field 7D, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Pratt and Whitney Aircraft, Middletown, Conn. Aircraft Nuclear engine Lab.
GENERAL METHOD FOR ANALYZING REFRACTORY METAL ALLOYS USING THE VACUUM CUP ELECTRODE,
by Elizabeth C. Loao, E. W. Hobart andD. E. Fornwalt. 1963, 30p CONF-650311-1
Contract AT (30-1)-2789
Presented at Conference on Analytical Chemistry and Applied Spectroscopy, Pittsburgh, 5 Mar 1965.

Descriptors: (*Refractory metal alloys, Chemical analysis), (*Chemical analysis, Refractory metal alloys).

UCRL-14258 **Field 7B, 7E**
CFSTI Prices: HC$4.00 MF$1.00
Lawrence Radiation Lab., Univ. of California, Livermore.
RADIOCHEMICAL PURIFICATION PROCEDURES FOR THE ELEMENTS,
by Manfred Lindner. 13 Jul 65, 102p
Contract W-7405-eng-48

Descriptors: (*Metals, Purification), (*Radiochemistry, Metals).

8. EARTH SCIENCES AND OCEANOGRAPHY

N66-11207 **Field 8K**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE RESPONSE OF MAGNETIC INSTRUMENTS TO EARTHQUAKE WAVES,
by F. Eleman. Jun 65, 65p NASA-TM-X-55311, X-612-65-265

Descriptors: (*Seismic waves, Magnetic recording systems), Piezoelectric effects, Conductivity, Earthquakes.

N66-11769 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Lamont Geological Observatory, Palisades, N. Y.
RESEARCH ON QUANTITIES AND CONCENTRATIONS OF EXTRATERRESTRIAL MATTER THROUGH SAM- PLINGS OF OCEAN BOTTOMS. SIX M-MONTH STATUS REPORT, MAR-AUG 1965,
by W. A. Cassidy. 1965, 21p
Grant NsG-232-62
NASA CR-68009

Descriptors: (*Interstellar matter, Ocean bottom sampling), Sampling.

N66-12170 **Field 8B, 14E**
CFSTI Prices: HC$4.00 MF$0.75
Lockheed Aircraft Corp., Burbank, Calif.
SOME ASPECTS OF HYPERALTITUDE PHOTOGRAMMETRY. REPORT NO. 1,
by R. M. L. Baker, Jr. Jan. 64, 118p LR-17491
Contract NAS5-3390
NASA CR-68275

Descriptors: (*Photogrammetry, High altitude), (*Photointerpretation, Aerial photography), Sounding rockets.

N66-12171 **Field 8B, 14E**
CFSTI Prices: HC$3.00 MF$0.75
Lockheed Aircraft Corp., Burbank, Calif.
PHOTO INTERPRETATION OF WHITE SANDS ROCKET PHOTOGRAPHY. REPORT NO. 2,
by P. M. Merifield and J. Rammelkamp. Mar 64, 92p LR-17666
Contract NAS5-3390
NASA CR-68274

Descriptors: (*Photointerpretation, Aerial photography), (*Aerial photography, Sounding rockets).

Identifiers: Aerobee, Viking, V-2 (Missile).

N66-12981 **Field 8G**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab. California Univ., Berkeley.
OCCURRENCE OF BIOGENIC STERANES AND PENTACYCLIC TRITERPANES IN AN EOCENE SHALE /60 MILLION YEARS/ AND IN AN EARLY PRE-CAMBRIAN SHALE /2.7 BILLION YEARS PRELIMINARY REPORT,
by I. Belsky, A. L. Burlingame, M. Calvin, and P. Haug. 1965, 14p
Contract NsG-101
NASA CR-68305

Descriptors: (*Petrology, Shale), (*Hydrocarbons, Shale), (*Shale, Hydrocarbons).

N66-12986 **Field 8D**
CFSTI Prices: HC$2.00 MF$0.50
Australian National Univ., Canberra. Dept. of Geophysics.
FRACTIONATION OF FLUORINE, CHLORINE AND OTHER TRACE ELEMENTS DURING DIFFERENTIATION OF A THOLEIITIC MAGMA,
by L. Greenland and J. F. Lovering. 1964. 42p
Grants NsG-319-6, NsG-322
NASA CR-68370

Descriptors: (*Petrology, Halogens), (*Halogens, Petrology).

PB-169 184 **Field 8J, 8A**
CFSTI Prices: HC$7.00 MF$1.50
Florida State Univ., Tallahassee. Sedimentology Research Lab.
MARINE GEOLOGY, USNS ELTANIN CRUISES 9-15.
Dec 65, 314p

Descriptors: (*Marine geology, Antarctic regions), (*Antarctic regions, Marine geology), Well logging, Ocean bottom sampling, Marine biology, Ocean bottom topography, Photographs, Oceanographic data.

Identifiers: Eltanin cruiser, Scotia Sea, Weddell Sea.

This paper covers cruises 9 - 15 which occurred serially from August 1963 to December 1964. The operational areas during this period were geographically transitional as emphasis shifted from the Scotia Sea to the South Pacific. The geological investigation of the sea floor surrounding the Antarctic continent is initiated by sampling the bottom with gravity corers, dredges, and grab samplers. The primary emphasis of the collection program is in the coring operation which uses a Ewing piston corer modified to take plastic core liners. A summary of the coring operations is presented.

PB-169 334 **Field 8K, 17J**
CFSTI Prices: HC$1.10 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
IDENTIFICATION OF SEISMIC PHASES SALMON EVENT,
by L. M. Lowrie. May 65, 9p

Descriptors: (*Seismology, Underground explosions), (*Underground eplosions, Seismology), Nuclear explosions, Seismic waves, Data processing systems, Digital computers.

Identifiers: Salmon event.

An attempt is made to identify individual seismic phases for the SALMON Event by the use of particle trajectory plots. The plotting was done by an IBM 1620 digital omputer. Input data for the computer program were vertical, radial and transverse components of earth particle displacement which had been corrected for instrument response. The output of the computer program consists of four measures of particle displacement plotted against time. These are the amplitude of the earth particle displacement vector and the amplitude of this vector as projected on the vertical-radial, the horizontal, and the vertical-transverse planes. For each of the three projections a phase angle is also plotted which describes the position of the earth particle in the plane of reference. For example, in the vertical-radial plane, the phase angles 0, 90, 180 and 270 degrees define motion as being away from the source, up, toward the source, and down, respectively. In effect, then the particle motion is plotted in polar coordinates against a linear time scale. (Author)

PB-169 335 **Field 8K, 9B**
CFSTI Prices: HC$1.60 MF$0.50
Coast and Geodetic Survey, Wash., D. C.
REVISION OF FOURIER ANALYSIS AND SYNTHESIS PROGRAMS,
by Leslie M. Lowrie. Oct 65, 19p

Descriptors: (*Seismology, Fourier analysis), (*Fourier analysis, Seismology), (*Programming (Computers), Fourier analysis), Seismic waves, Data processing systems, Digital computers.

Identifiers: IBM 1620.

The use of digital computer programs to analyze various types of seismograph records is discussed. Fouier analysis and synthesis programs for the IBM 1620 computer have been rewritten, resulting in computer time savings of about 60 percent for analysis and 70 percent for synthesis. (Author)

RME-4530 **Field 8G, 18H**
CFSTI Prices: HC$2.00 MF$0.50
Division of Raw Materials (AEC), Washington, D. C.
EXAMINATION OF SELECTED AREAS IN PERU,
by John W. Gabelman. Jul 62, 30p
Prepared in cooperation with Junta de Control de Energia Atomica, Lima (Peru).

Descriptors: (*Geology, Radioactivity), (*Uranium, Peru).

9. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-294 845 **Field 9A, 9E**
CFSTI Price: HC$4.00
General Electric Co., Syracuse, N. Y. Electronics Lab.
LARGE-AREA ELECTRONIC DISPLAY PANEL,
Quarterly progress rept. no. 2, 1 Sep-30 Nov 62,
by R. B. Gethmann and M. L. Noble. 30 Nov 62, 123p
Contract DA-36-039-sc-90755,
Task DA-3A99-13-001-05
See also AD-622 406.

Descriptors: (*Display systems, Electronic equipment), (*Electron beams, Display systems), Deformation, Thermoplastics, Optical equipment, Electron guns, Electron optics, Cathode ray tube screens, Focusing, Optical images, Focusing, Xenon lamps, Electromagnetic lenses.

Effort is presented to advance the state-of-the-art of large-area electronic display by developing a new high-resolution electron-beam-deformation system for thermoplastic film and a novel optical projection system. Discussion is included on the optical system and a number of the tasks of lesser importance. The major emphasis is placed on the recently completed deformation system electronics and Synch Generator. A detailed discussion is given of the design, construction, and preliminary testing of the new Gethmann-ModifiedGleichauf electron-gun. An appendix is included to give a detailed account of the digital synch generator. (Author)

AD-402 832 **Field 9E, 20N**
CFSTI Price: HC$2.00
Microwave Lab., Stanford Univ., Calif.
MILLIMETER GENERATION AND NONLINEAR PROPAGATION IN FERROMAGNETICS,
by H. J. Shaw. 8 Dec 61, 37p Rept. no. 1, ML-1005
Contract DA-36-039-AMC-00041 (E),
Proj. DA-3-99-21-001

Descriptors: (*Pulse generators, Millimeter waves), (*Ferromagnetic materials, Wave transmission), Shock waves, Magnetic fields, Pulse systems, Propagation, Zinc alloys, Yttrium, Extremely high frequency, Magnetization, Field theory.

Identifiers: Ferrites (Electronics), Spin waves.

The power output of the 50 Gc/s Type I generator was increased to 10 milliwatts, and some progress was made in measuring its output spectrum. A Type II generator was operated in the 50 Gc/s range. On the theory of transient magnetization, an analytic formulation is given which is accurate for arbitrary pulsed field shape in the range of slow pulsed field rise. An initial experimental investigation was made of other means of spin wave suppression involving operation at frequencies slightly below the spin wave manifold. Success was achieved in the application of digital computer procedures to the problem of electromagnetic shock wave formation in ferrites. A numerical example of an application to pulse sharpening predicts very favorable results which may have important use in steepening of the initial rise of the dc field pulses for the Type II microwave generator. A final report on the formation and propagation of electromagnetic shock waves in ferrites is under preparation. A new pulse-shaping procedure has given closer control of pulsed field shape, contributing to improvements in output power and spectrum of the Type I generator. A procedure was developed for determining the detailed shape of fast-rising pulsed fields which gives improved accuracy over previous methods when the pulsed field coil is very small. (Author)

AD-455 010 **Field 9A**
CFSTI Price: HC$3.60
Westinghouse Defense and Space Center, Baltimore, Md. Aerospace Div.
PLANAR INTEGRATION OF THIN FILM UNITS.
Quarterly progress rept. no. 3, 15 Jul-14 Oct 64, by M. Lauriente, J. M. Winter and C. W. Wyble. 14 Oct 64, 31p
Contract DA-36-039-AMC-03732 (E), Proj. DA-1G0-22001-A057

Descriptors: (*Integrated circuits, Circuit intercon nections), (*Circuit interconnections, Integrated cir cuits), (*Semiconducting films, Integrated circuits), Microminiaturization (Electronics), Films, Silicon, Reliability (Electronics), Manufacturing methods, Oxidation, Aluminum, Copper, Temperature, Adhesion, Glass, Environmental tests, Processing.

Techniques used to fabricate the experimental models are described with the benefit of flow diagrams. Oxidation of aluminum and copper pads due to exposure to air at the curing temperature of the resin required rework of these pads. It was possible to clean the copper pads with a mild etchant but the aluminum pads had to be metallized with chrome-gold. Some dispersion was observed after deposition of the heavy interconnects extending beyond the width of the mask. Some theories are offered to explain the phenomenon. Adhesion tests were applied successfully to all permutations except reworked aluminum pads on glass. (Author)

AD-467 353 **Field 9C, 14B**
CFSTI Prices: HC$5.00 MF$1.00
Polytechnic Inst. of Brooklyn, N. Y. Microwave Research Inst.
A SUMMARY OF CURRENT RESEARCH IN THE MICROWAVE RESEARCH INSTITUTE PROGRAMS.
Progress rept. no. 27, 1 Oct 64-31 Mar 65, by Ernst Weber and Walter K. Kahn. 31 Mar 65, 158p Rept. no. R-452.27.65
Contract AF49 (638)-1402, Proj. AF-4751

Descriptors: (*Microwave equipment, Scientific research), (*Electronics, Scientific research), Microwaves, Theory, Game theory, Films, Electromagnetic waves, Waveguides, Dielectrics, Diffraction, Mathematical analysis, Images, Optics, Vector analysis, Plasma physics, Semiconductor devices, Cathodes, Propagation, Transmission lines, Stochastic processes, Micro wave networks, Television communication systems, Control systems, Phase-locked communication systems, Circuits, Inertial navigation, Semiconduc tors, Liquids, Ferrites.

This report summarizes the research programs at the Microwave Research Institute of the Polytechnic Institute of Brooklyn from 1 October 1964 - 31 March 1965. Each activity reports in summary fashion specific results obtained during the period in question; the sponsoring agency for the activity is individually acknowledged. Contributions are compiled under six headings: Electromagnetics; Plasma Electrophysics and Electronics; Solid State and Materials Research; Microwave Circuits; Network Theory; and Systems, Communications and Control.

AD-467 356 **Field 9B, 5J**
CFSTI Prices: HC$7.60 MF$0.75
Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
A PROBLEM SOLVING FACILITY.
Technical rept. for Apr 63-Jul 65, by Richard L. Wexelblat. 20 Jul 65, 72p Rept. no. 66-02
Contract Nonr-551 (48)

Descriptors: (*Computers, Problem solving), (*Problem solving, Computers), Decision making, Reasoning, Real time, Information retrieval, Program ming (Computers), Programming languages, Computer storage devices, Learning, Computer logic, Digital computers, Human engineering.

The objective of the reported work is to set up a computer with a large memory for on-line, real time use to aid in human problem solving, combining the computational abilities of the computer and its ability to store, retrieve and manipulate large masses of data. Information retrieval programs use Multilist techniques to simulate an associative memory. Multilang, the Executive language, serves both as a control language and as a programming language. (Author)

AD-467 454 **Field 9B**
CFSTI Prices: HC$3.00 MF$0.50
Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
A STORAGE AND RETRIEVAL SYSTEM FOR REALTIME PROBLEM SOLVING,
by Noah S. Prywes. 1 Jun 65, 52p Rept. no. 66-05
Contract Nonr-551 (48)

Descriptors: (*Information retrieval, Computers), (*Computers, Information retrieval), (*Decision making, Management engineering), (*Problem solving, Real time), Computer storage devices, Programming languages, Programming (Computers), Cathode ray tubes, Military requirements, Data processing systems.

Identifiers: List processing, File structures, Multi-list system.

A description of the storage and retrieval system which is an integral part of the system-programs of a realtime computer system implemented in conjunction with a research program on military problem solving. The system was designed specifically to mechanize certain operations and to provide capabilities frequently required in problem solving.

ANL-7023 **Field 9B, 18K**
CFSTI Prices: HC$4.00 MF$0.75
Argonne National Lab., Ill.
THE ARGONNE-REVISED THERMOS CODE,
by B. J. Toppel and I. Baksya. Mar 65, 112p
Contract W-31-109-eng-38

Descriptors: (*Thermal neutrons, Reactor lattice parameters), (*Programming languages, Reactor lattice parameters).

BNWL-147 **Field 9B, 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
SWISSCHEESE. A 7090 FORTRAN IV CODE FOR THERMAL-HYDRAULIC ANALYSIS OF GAS-COOLED NUCLEAR REACTORS,
by C. E. Leach. Oct 65, 87p
Contract AT (45-1)-1830

Descriptors: (*Gas-cooled reactors, Thermal analysis), (*Programming languages, Gas-cooled reactors).

Identifiers: Swisscheese.

C13.44-82 **Field 9C**
CFSTI Price: MF$0.50
National Bureau of Standards, Boulder, Colo.
MICROWAVE IMPEDANCE MEASUREMENTS AND STANDARDS,
by Robert W. Beatty. 12 Aug 65, 39p NBS Monograph-82
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.20.

Descriptors: (*Microwaves, Electrical impedance), Standards, Measurement, Test methods, Errors, Standing wave ratios, Reflectometers, Propagation.

A survey and discussion of well-known microwave impedance measurement techniques is presented. The discussion includes an introduction which emphasizes basic concepts and reflection coefficient-VSWR relationships. Sources of error in the various measurement techniques are discussed and methods to reduce errors are presented. The discussion of errors in slotted line and reflectometer techniques is most thorough. Methods using rotating loops and resonance lines are included and a brief discussion of microwave impedance standards is given. (Author)

LA-3318 **Field 9A, 18A, 18D, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
ELECTRICAL CHARACTERISTICS OF COAXIAL CABLE,
by Grenfell P. Bolcourt. 15 Apr 65, 6p
Contract W-7405-eng-36

Descriptors: (*Coaxial cables, Electrical properties), (*Thermonuclear reactions, Test equipment).

LA-3354 **Field 9B, 20B**
CFSTI Prices: HC$2.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
AN INTEGRATED SERIES OF CRYSTALLOGRAPHIC COMPUTER PROGRAMS. IX. REPARATION OF TABLES FOR PUBLICATION,
by Howard H. Cady. Jul 65, 66p
Contract W-7405-eng-26

Descriptors: (*Crystallography, Programming (Computers)).

N66-10561 **Field 9B**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, Houston, Tex. Manned Spacecraft Center.
PROCEEDINGS OF NASA INDUSTRY PERT COMPUTER CONFERENCE.
1964, 171p NASA-TM-X-56870

Descriptors: (*Cost effectiveness, Management Control systems), (*Management control systems, Symposia), (*Programming (Computers), Cost effectiveness).

Identifiers: Pert.

N66-10618 Field 9F
CFSTI Prices: HC$2.00 MF$0.50
Auburn Univ., Ala.
RADIO FREQUENCY SYSTEMS. MILLIMETER WAVES STUDY.
Quarterly rept., no. 4, 1 Dec 64-1 Mar 65,
by E. R. Graf and M. A. Honnell. 1965, 31p
Contract NAS8-11184
NASA CR-67879

Descriptors: (*Millimeter waves, Altimeters), (*Radiofrequency, Television equipment).

N66-10625 Field 9C
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Pittsfield, Mass. Ordnance Dept.
DESIGN AND MANUFACTURE OF DIRECT CURRENT TORQUER AMPLIFIERS.
Final summary rept.,
by D. W. Gilchrest and A. E. Schutz. 30 Jul 65, 31p FDU-65-8
Contract NAS8-11876
NASA CR-67791

Descriptors: (*Servomechanisms, Direct current), (*Pulse amplifiers, Modulation).

N66-10688 Field 9B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
NIMBUS HRIR EQUIPMENT DIAGNOSTIC TEST PROGRAM,
by H. R. Stagner. Aug 65, 32p NASA-TM-X-55293, X-564-65-328

Descriptors: (*Meteorological satellites, Infrared equipment), (*Infrared equipment, Programming (Computers).

Identifiers: Nimbus satellite.

N66-10774 Field 9C
CFSTI Prices: HC$2.00 MF$0.50
Hittman Associates, Inc., Baltimore, Md.
THERMOELECTRIC BONDING STUDY.
Quarterly progress rept., 1 Jun-31 Aug 65. 30 Sep 65, 36p HIT-186
Contract NAS5-3973
NASA CR-67672

Descriptors: (*Metals, Bonding), (*Bonding, Lead), Tellurides, Thermoelectricity.

Identifiers: Lead telluride.

N66-10889 Field 9C
CFSTI Prices: HC$1.00 MF$0.50
Smith Electronics, Inc., Cleveland, Ohio.
STUDY OF SHORT TERM PHASE STABILITY.
Interim rept. 17 Mar-5 Sep 65,
by R. A. Mostrom. 6 Sep 65, 20p
Contract NASA-11592
NASA CR-67705

Descriptors: (*Frequency converters, Theory), Harmonic analysis, Fourier analysis, Phase (Electronics), Stability.

N66-10928 Field 9B
CFSTI Prices: HC$3.00 MF$0.75
Maryland Univ., College Park. Computer Science Center.
TREETRAN - A FORTRAN IV SUBROUTINE PACKAGE FOR MANIPULATION OF ROOTED TREES,
by J. L. Pfaltz. Sep 65, 70p TR-65-23
Grant NsG-398
NASA CR-67920

Descriptors: (*Programming languages, Topology).

Identifiers: Treetran, Fortran.

N66-10929 Field 9B
CFSTI Prices: HC$2.00 MF$0.50
Arizona Univ., Tucson. Engineering Experiment Station.
HYBRID COMPUTER MONTE-CARLO TECHNIQUES,
by B. K. Conant, G. A. Korn, B. A. Mitchell, Jr., and R. H. Whigham. 1965, 40p Rept. no. EES-9
Grant NsG-646
NASA CR-67918
Prepared in cooperation with B. A. Mitchell, Electron Assoc., Inc., Princeton, N. J.

Descriptors: (*Analog-digital computers, Monte Carlo method).

N66-11201 Field 9A
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
EFFECTS OF GAMMA RADIATION ON SCR'S USED IN SWITCHING MODE AND IN APPLICATION TO ATTITUDE CONTROL MOTOR DRIVE BRIDGE,
by G. D. Smith. 18 May 65, 19p NASA-TM-X-55305, X-636-65-241

Descriptors: (*Rectifiers, Gamma rays), (*Gamma rays, Silicon), Cobalt, Radioactive isotopes.

N66-11203 Field 9B
CFSTI Prices: HC$1.00 MF$0.50
Goddard Space Flight Center. National Aeronautics and Space Administration, Greenbelt, Md.
A IMP MISSION PROFILE AND REAL TIME COMPUTING SYSTEM DESCRIPTION,
by A. J. Fuchs, R. J. Sandifer and R. T. Groves. 22 Jun 65, 24p NASA-TM-X-55307, X-500-65-255

Descriptors: (*Interplanetary trajectories, Monitors), Real time, Spacecraft.

Identifiers: IMP (Interplanetary monitoring platform).

N66-11209 Field 9F
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
OPTIMUM QUANTIZATIONS,
by J. C. Morakis. Jul 65, 33p NASA-TM-X-55313, X-520-65-274

Descriptors: (*Functions, Errors), Probability, Noise, Density.

Identifiers: Continuous functions, Quantizer.

N66-11212 Field 9F
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SQUARE-TO-SINE WAVE FILTER,
by W. R. Limberis. Jul 65, 10p NASA-TM-X-55316, X-636-65-301

Descriptors: (*Waveguide filters, Stability), Fourier series.

N66-11221 Field 9F
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A SHORTENED HORN-REFLECTOR ANTENNA,
by P. A. Lantz. Sep 65, 22p NASA-TM-X-55326, X-525-65-336

Descriptors: (*Horn antennas, Reflectors), Partial differential equations, Antenna feeds.

Identifiers: Cassegrain antenna.

N66-11234 Field 9A
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
LOW POWER NANOSECOND PULSE AND LOGIC CIRCUITS USING TUNNEL DIODES,
by C. A. Cancro, N. M. Garrahan, and S. Paull. Nov 65, 29p NASA-TM-X-55340, X-711-65-435

Descriptors: (*Circuits, Tunnel diodes), (*Tunnel diodes, Circuits), Transistors.

N66-11401 Field 9C
CFSTI Prices: HC$5.00 MF$1.25
California Univ., Berkeley. Electronics Research Lab.
NOTES ON SYSTEM THEORY. VOLUME VII.
May 65, 175p ERL-65-14
Grants NsG-354, AF-AFOSR-639-64
NASA CR-67822

Descriptors: (*Set theory, Analysis), (*Electrical networks, Synthesis), Feedback, Stability.

N66-11752 Field 9A
CFSTI Prices: HC$1.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Center for Space Research.
STUDY OF A RADIO PROBE OF THE EXTENDED SOLAR CORONA.
Quarterly progress rept. no. 5, 1 Jul-30 Sep 65,
by J. V. Harrington. 1965, 6p
Contract NASr-249
NASA CR-68017

Descriptors: (*Solar corona, Radiofrequency), Servomechanisms, Optical equipment.

Identifiers: Optical sensor.

N66-11799 Field 9E
CFSTI Prices: HC$3.00 MF$0.75
Northeastern Univ., Boston, Mass. Electronics Research Lab.
RELIABLE SOLID-STATE CIRCUITS.
Semiannual rept., 1 Dec 64-31 May 65,
by R. E. Bach, Jr., A. W. Carlson, C. A. Furciniti, and R. E. Scott. 1 Jul 65, 66p
Contract NGR-22-011-007
NASA CR-68044

Descriptors: (*Switching circuits, Reliability), Amplifiers, Microminiaturization (Electronics), Electronic equipment.

N66-11808 Field 9C
CFSTI Prices: HC$3.00 MF$0.75
Raytheon Co., Waltham, Mass. Research Div.
DESIGN, DEVELOPMENT, FABRICATION, AND DELIVERY OF THREE /3/ STRAIN GAGE ACCELEROMETERS.
Final rept., 23 Jun 64-23 Jun 65,
by G. Doering, W. Rindner, and R. Wonson. 1965, 96p S-782
Contract NAS8-11633
NASA CR-68072

Descriptors: (*Strain gages, Design), (*Accelerometers, Design), Piezoelectric effect, Crystals, Anisotropy.

N66-12178 **Field 9A, 13H**
CFSTI Prices: HC$4.00 MF$1.00
Martin Co., Orlando, Fla.
ESTABLISHMENT OF STANDARDS FOR COMPATABILITY OF PRINTED CIRCUIT AND COMPONENT LEAD MATERIALS.
Final rept, 27 Jun 64-27 Oct 65,
by D. J. Collins, L. G. Hall, W. R. Hutchinson andS. C. Osborne. Oct 65, 140p OR-6608
Contract NAS8-11474
NASA CR-68279

Descriptors: (*Printed circuits, Materials), (*Standards, Printed circuits), Compatibility, Electronic equipment, Electric wire.

N66-12503 **Field 9F, 22B**
CFSTI Prices: HC$6.00 MF$1.25
Dorne and Margolin, Inc., Westbury, N. Y.
THE DESIGN OF AN OMNIDIRECTIONAL ANTENNA SYSTEM FOR THE APOLLO SPACECRAFT,
by R. Anderson, A. Dorne, L. Leopold, andE. Shube. 22 Sep 64, 236p 1791.1
Contract NAS9-2286
NASA CR-65178

Descriptors: (*Omnidirectional antennas, Spacecraft), (*Space communication systems, Omnidirectional antennas), Radio equipment.

Identifiers: Apollo.

N66-13078 **Field 9B**
CFSTI Prices: HC$2.00 MF$0.50
Georgia Inst. of Tech., Atlanta. School of Electrical Engineering.
BIBLIOGRAPHY AND SUMMARY OF METHODS RELATED TO THE ERROR ANALYSIS OF HYBRID COMPUTERS,
by T. M. Wright, Jr. 14 Oct 64, 23p
Contract NAS8-2473
NASA CR-68405

Descriptors: (*Analog-digital computers, Errors), (*Bibliographies, Analog-digital computers).

PB-169 144 **Field 9D**
CFSTI Prices: HC$1.00 MF$0.50
Air Materiel Command, Wright-Patterson AFB, Ohio. Office of Air Research.
LINEAR NOISE FILTERING AND PREDICTING SYSTEMS,
by Frank W. Bubb. Dec 50, 24p
AF TR-6331,
ATI 144 265

Descriptors: (*Information theory, Signal-to-noise ratio), (*Noise (Radar), Mathematical analysis), Servomechanisms, Communication equipment, Filters (Electromagnetic waves), Noise analyzers, Statistical functions.

A simple method is presented here for the design of physical systems such as servomechanisms, communication devices, filters and the like, which have to operate in the presence of random disturbances. A typical problem in this field is that of designing a predictor needed in gunfire control, which is disturbed by radar and other noise. The analysis uses the Cardinal Spectrum Method and remains in the time domain, in contrast to other methods which employ Fourier analysis on the complex plane. The analysis culminates in a straightforward arithmetic procedure for solving noise problems. (Author)

PB-169 380 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Reclamation, Denver, Colo. Electric Power Branch.
WEATHER AND LOAD PATTERN CORRELATION STUDY TO DEVELOP A METHOD OF SHORT-RANGE LOAD FORECASTING BASED ON WEATHER AND LOAD DATA,
by R. R. Fillenberg and J. S. Tronvold. 13 Nov 65, 57p EP-9

Descriptors: (*Electric power production, Mathe matical prediction), Power supplies, Meteorological parameters, Weather forecasting, Correlation tech niques, Electrical engineering.

Weather patterns and electric power system load characteristics were investigated with a digital computer for linear correlation. Total system and 3 small local area loads and weather data from 7 stations of the Region 6, Eastern Division, Missouri River Basin power system were studied. Daily load characteristics investigated were minimum load, noon peak, evening peak and average load, with average load showing best correlation. Weather elements of temperature, wind velocity, cloud cover and precipitation versus load were machine tested in single and multiple correlations. Conclusions were: (1) Loads of small areas show a higher degree of correlation with weather than do large area loads where diversity in load and weather degrade correlation. (2) Correlations were found between average daily load versus average daily temperature, wind velocity, and cloud cover in descending order of significance. Correlations between load and precipitation were insignificant. Load patterns of an area conform to weather on a daily and seasonal basis. (3) A formula was developed for use in short range, 1 to 30 days, forecasting of load which may utilize daily, weekly or monthly weather predictions, and is based on factoring a computed small local area typical load in each of 3 major areas with essentially uniform weather. The 3 major areas together comprise the total system area. (Author)

RFP-629 **Field 9B, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Golden, Colo.
FORTRAN II PROGRAM FOR REDUCTION OF SPECTROPHOTOMETRIC REACTION KINETICS DATA,
by G. J. Workema. 17 Nov 65, 23p
Contract AT (29-1)-1106

Descriptors: (*Reaction kinetics, Programming languages), (*Programming languages, Reaction kinetics).

10. ENERGY CONVERSION (NON-PROPULSIVE)

N66-10613 **Field 10A**
CFSTI Prices: HC$4.00 MF$1.00
Westinghouse Electric Corp., Baltimore, Md. Aerospace Div.
INVESTIGATION OF THIN DIELECTRIC FILMS FOR ENERGY CONVERSION.
Final rept.
26 Jul 65, 143p AAD-51255
Contract NAS2-1995
NASA CR-67828

Descriptors: (*Solar radiation, Dielectric films), (*Dielectric films, Solar radiation).

N66-10638 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic Div., General Dynamics Corp., San Diego, Calif.
RADIATION EFFECTS ON SILICON SOLAR CELLS.
Monthly progress rept. no. 4, 1-30 Apr 62,
by V. A. J. Van Lint and E. G. Wikner. 8 May 62, 4p GACD-3160
Contract NAS7-91
NASA CR-67648
Prepared in cooperation with John Jay Hopkins Lab. for Pure and Applied Science.

Descriptors: (*Solar cells, Radiation damage).

N66-10645 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic Div., General Dynamics Corp., San Diego, Calif.
RADIATION EFFECTS ON SILICON SOLAR CELLS.
Monthly progress rept. no. 3, 1-31 Mar 62,
by D. M. J. Compton and V. A. J. Van Lint. 9 Apr 62, 3p GACD-3082
Contract NAS7-91
NASA CR-67633

Descriptors: (*Solar cells, Radiation damage).

N66-10655 **Field 10C**
CFSTI Prices: HC$4.00 MF$0.75
Douglas Aircraft Co., Inc., Santa Monica, Calif. Astropower Lab.
INORGANIC SEPARATOR FOR HIGH TEMPERATURE SILVER-ZINC BATTERY.
Final rept., 27 Jul 64-29 Jul 65,
Sep 65, 107p SM-46220-F
Contract NAS3-6007
NASA CR-54749

Descriptors: (*Battery separators, Materials), Silver, Zinc.

N66-10682 **Field 10A**
CFSTI Prices: HC$5.00 MF$1.25
General Electric Co., Philadelphia, Pa. Missile and Space Div.
SOLAR THERMIONIC FLIGHT EXPERIMENTAL STUDY. VOLUME IV-APPENDICES.
Final rept.
1 May 65, 182p
Contract NAS7-100
NASA CR-67816
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Rept. nos. JPL-950852, 65SD4286, Vol. 4.

Descriptors: (*Sun, Thermionic emission), Flight.

Identifiers: Solar thermionic flight.

N66-10683 **Field 10C**
CFSTI Prices: HC$2.00 MF$0.50
Meteorology Research, Inc., Altadena, Calif.
FURTHER MOISTURE ANALYZER STUDIES.
Final rept.
15 Sep 65, 29p MR165-FR-300
Contract NAS7-100
NASA CR-67811
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Rept. no. JPL-950685.

Descriptors: (*Hydrometers, Sensitivity), Phosphorus, Thin films.

Identifiers: Phosphorus pentoxide.

N66-10752 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
American Cyanamid Co., Stamford, Conn.
DEVELOPMENT OF HIGH-PERFORMANCE LIGHT-WEIGHT ELECTRODES FOR HYDROGENOXYGEN FUEL CELLS.
First quarterly rept. no. 1, 5 Apr-5 Jul 65,
by W. P. Colman, D. Gershberg, and J. Di Palma.
15 Nov 65, 49p
Contract NAS3-6477
NASA CR-54759

Prepared in cooperation with Stanford Research Labs., Calif.

Descriptors: (*Electrodes, Fuel cells), (*Fuel cells, Electrodes), Hydrogen, Oxygen.

N66-10883 **Field 10A, 18H**
CFSTI Prices: HC$1.00 MF$0.50
General Atomic Corp., San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
RADIATION EFFECTS ON SILICON SOLAR CELLS.
Quarterly progress rept. no. 3, 1 Jun-31 Aug 64, by J. W. Harrity and V. A. J. Van Lint. 18 Sep 62, 25p GADC-3511
Contract NAS7-91
NASA CR-67607

Descriptors: (*Solar cells, Radiation damage), (*Radiation damage, Solar cells), Silicon.

N66-10926 **Field 10A, 9A, 20L**
CFSTI Prices: HC$2.00 MF$0.50
Clevite Corp., Cleveland, Ohio. Electronic Research Div.
STUDY OF THIN FILM LARGE AREA PHOTOVOLTAIC SOLAR ENERGY CONVERTER.
Second quarterly rept. no. 2, 1 Jan-31 Mar 63, by F. Augustine, W. J. Deshotels, and A. Carlson. 5 Apr 63, 36p
Contract NAS7-203
NASA CR-67906

Descriptors: (*Semiconducting films, Energy conversion), (*Solar radiation, Energy conversion), Cadmium compounds, Sulfides, Photoelectric cells (Semiconductors), Vapor plating.

N66-11208 **Field 10B**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THE BATTERY CHARGER FOR THE ATMOSPHERE EXPLORER B SPACECRAFT,
by J. Paulkovich and G. E. Rodriguez. Jul 65, 26p NASA-TM-X-55312, X-636-65-271

Descriptors: (*Battery chargers, Spacecraft), Atmosphere, Packaging.

Identifiers: Explorer B.

N66-11217 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
DESIGN OF A MEDIUM POWER DC TO 115 VOLT, 60 HERTZ AC INVERTER,
by W. R. Limberis. Aug 65, 18p NASA-TM-X-55322, X-636-65-315

Descriptors: (*Inverters, Design), Direct current, Alternating current.

Identifiers: Explorer XVII.

N66-11220 **Field 10C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SEPARATOR MATERIALS FOR SILVER OXIDE ZINC AND SILVER OXIDE CADMIUM ELECTROCHEMICAL CELLS.
Interim rept.,
by T. J. Hennigan. Aug 65, 34p NASA-TM-X-55325, X-716-65-331

Descriptors: (*Battery separators, Materials), Silver, Zinc, Oxides, Cadmium.

N66-11229 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
SOLAR CELL CALIBRATION TECHNIQUES,
by W. G. Gdula. Sep 65, 16p
Contract NAS5-2382
NASA TM-X-55334
Prepared in cooperation with Taag Designs, Inc.

Descriptors: (*Solar cells, Calibration), Diffusion.

N66-11247 **Field 10C**
CFSTI Prices: HC$4.00 MF$1.00
Globe-Union, Inc., Milwaukee, Wis.
A PROGRAM TO DEVELOP A HIGH-ENERGY DENSITY PRIMARY BATTERY WITH A MINIMUM OF 200 WATT HOURS PER POUND OF TOTAL BATTERY WEIGHT.
Quarterly rept. no. 5, 1 Jul-30 Sep 65, by R. W. Adler, J. R. Huff, W. L. Towle, W. E. Elliott, and J. L. Jamrozy. 15 Oct 65, 129p
Contract NAS3-6015
NASA CR-54744

Descriptors: (*Primary cells, Design), (*Storage batteries, Tests), Anodes (Electrolytic cell), Electric discharges.

N66-11672 **Field 10C**
CFSTI Prices: HC$1.00 MF$0.50
Quality Evaluation Lab., Naval Ammunition Depot, Crane, Ind.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS. ACCEPTANCE TEST OF SONOTONE,
by E. C. Bruess. 2 Sep 65, 12p QE/C-65-583
NASA CR-67713

Descriptors: (*Spacecraft, Power supplies), (*Storage batteries, Tests), Nickel, Cadmium.

N66-11765 **Field 10A**
CFSTI Prices: HC$3.00 MF$0.75
Power Information Center. Pennsylvania Univ., Philadelphia.
STUDY PAPERS ON THE AUXILIARY ELECTRODE,
by P. F. Grieger. Oct 65, 88p PIC-BAT-209/9
Contract NASr-191
NASA CR-67987
Prepared in cooperation with Interagency Advanced Power Group, Wash. D. C.

Descriptors: (*Batteries + components, Electrodes), Nickel, Cadmium, Carbon, Platinum.

N66-12168 **Field 10B**
CFSTI Prices: HC$3.00 MF$0.75
Union Carbide Corp., Parma, Ohio. Research Lab.
STUDY PROGRAM TO IMPROVE FUEL CELL PERFORMANCE BY PULSING TECHNIQUES.
Final rept. for 31 Aug 65,
by M. L. Kronenberg. 1965, 73p
Contract NAS3-6460
NASA CR-54767

Descriptors: (*Fuel cells, Performance (Engineering), (*Electrodes, Fuel cells), Electric discharges.

N66-12265 **Field 10B, 10A**
CFSTI Prices: HC$7.00 MF$1.75
TRW Equipment Labs., Cleveland, Ohio.
BRAYTON CYCLE CAVITY RECEIVER DESIGN STUDY, JUNE 25, 1963 - JUNE 15, 1965.
22 Nov 65, 308p ER-6497
Contract NAS3-2779
NASA CR-54752

Descriptors: (*Brayton cycle, Solar collectors), Energy conversion, Programming (Computers), Solar radiation.

N66-12347 **Field 10C, 22B**
CFSTI Prices: HC$4.00 MF$1.00
Livingston Electronic Corp., Montgomeryville, Pa.
DEVELOPMENT OF A LOW TEMPERATURE BATTERY FOR SPACE PROBE APPLICATIONS.
Final rept., 24 Jun 64-23 Jun 65,
by G. M. Armstrong and W. F. Meyers. 1965, 142p
Contract NAS3-6009
NASA CR-54733

Descriptors: (*Low temperature batteries, Space probes), (*Space probes, Low temperature batteries), Ammonia.

N66-12870 **Field 10C, 22B**
CFSTI Prices: HC$2.00 MF$0.50
Borden Chemical Co., Philadelphia, Pa. Central Research Lab.
IMPROVED SEPARATORS FOR SILVER OXIDE-ZINC AND SILVER OXIDE-CADMIUM CELLS FOR SPACECRAFT APPLICATION.
Quarterly progress report, no. 1, 10 Nov 64-9 Feb 65,
by H. E. Hoyt and H. L. Pfluger. 1965, 31p
Contract NAS5-9107
NASA CR-68227

Descriptors: (*Electrolytic cells, Membranes), (*Diffusion, Electrolytic cells), Separation, Space craft, Silver compounds, Oxides, Cadmium, Zinc.

11. MATERIALS

BNL-953 **Field 11F, 21F, 18I, 18J,2**
CFSTI Prices: HC$3.00 MF$0.50
Brookhaven National Lab., Upton, N. Y.
HIGH-TEMPERATURE LIQUID-METAL TECHNOLOGY REVIEW.
Bimonthly technical progress rev, vol 3, no. 4, Aug 65.
Nov 65, 52p
Contract AT (30-2)-GEN-16

Descriptors: (*Liquid metals, High-temperature research).

BNWL-113-9 **Field 11F, 20H, 18I, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PLUTONIUM ABSTRACTS. VOLUME 5, NUMBER 9.
29 Oct 65, 41p
Contract AT (45-1)-1830

Descriptors: (*Plutonium, Nuclear physics laboratories), (*Nuclear physics laboratories, Plutonium), Abstracts.

BOX-613-7 **Field 11A, 9C**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Kansas City, Mo.
CONDUCTIVE ADHESIVES. A SUBSTITUE FOR SOLDER,
by R. L. Martin. Aug 60, 8p
Contract AT (29-1)-613

Descriptors: (*Adhesives, Conductivity), (*Electronic equipment, Adhesives).

N66-10611 Field 11F
CFSTI Prices: HC$5.00 MF$1.00
Martin Co., Denver, Colo. Aerospace Div.
DETERMINATION OF LOW-TEMPERATURE FATIGUE PROPERTIES OF STRUCTURAL METAL ALLOYS.
Final rept., Jul 64-Aug 65,
by R. D. Keys, T. F. Kiefer, and F. R. Schwartzberg. Oct 65, 156p
Contract NAS8-11300
NASA CR-67818,
CR 65-70

Descriptors: (*Aluminum alloys, Fatigue (Mechanics), (*Stainless steel, Fatigue (Mechanics), (*Nickel alloys, Fatigue (Mechanics).

N66-10629 Field 11J
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
POLYMERS FOR SPACECRAFT HARDWARE. MATERIALS SPECIFICATIONS AND ENGINEERING INFORMATION.
Monthly technical progress rept. no. 15, 10 Aug-9 Sep 65,
by R. F. Muraca and J. S. Whittick. 15 Sep 65, 12p JPL-950745
Contract NAS7-100
NASA CR-67692

Descriptors: (*Spacecraft, Silicone plastics), (*Silicone plastics, Spacecraft).

N66-10630 Field 11J
CFSTI Prices: HC$1.00 MF$0.50
Stanford Research Inst., Menlo Park, Calif.
DEVELOPMENT OF SPECIFICATIONS FOR POLYMERIC MATERIALS.
Monthly technical progress rept. no. 14, 10 Jul-9 Aug 65,
by R. F. Muraca and J. S. Whittick. 15 Aug 65, 4p JPL-950745
Contract NAS7-100
NASA CR-67754

Descriptors: (*Spacecraft, Silicone plastics), (*Silicone plastics, Spacecraft).

N66-10634 Field 11F
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A STUDY OF TUNGSTEN-TECHNETIUM ALLOYS.
Quarterly progress rept., 1 Apr-1 Jul 65.
Sep 65, 19p BNWL-142
Contract AT (45-1)-1830
NASA CR-67679

Descriptors: (*Technetium, Microstructure), (*Tungsten alloys, Microstructure).

N66-10668 Field 11F
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. Marshall Space Flight Center.
EXPERIMENTAL X-RAY STRESS ANALYSIS FOR PRECIPITATION HARDENED ALUMINUM ALLOYS,
by W. L. Prince and J. H. Wharton. 13 Sep 65, 29p NASA-TM-X-53329

Descriptors: (*Aluminum alloys, Stresses), X-ray diffraction analysis, Dispersion hardening.

N66-10669 Field 11H
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
INVESTIGATION OF THE COEFFICIENT OF FRICTION OF VARIOUS GREASES AND DRY FILM LUBRICANTS AT ULTRA HIGH LOADS FOR THE SATURN HOLD DOWN ARMS,
by K. E. Demorest and A. F. Whitaker. 14 Sep 65, 34p NASA-TM-X-53331

Descriptors: (*Friction, Test methods), (*Launch vehicles (Aerospace), Lubricants).

Identifiers: Saturn (Booster).

N66-10673 Field 11F
CFSTI Prices: HC$6.00 MF$1.50
General Electric Co., Cincinnati, Ohio. Space Power and Propulsion section.
POTASSIUM CORROSION TEST LOOP DEVELOPMENT. MATERIAL SPECIFICATIONS FOR ADVANCED REFRACTORY ALLOYS.
Topical rept. no. 3,
by R. G. Frank and D. N. Miketta. 1 Oct 65, 295p
Contract NAS3-2547
NASA CR-54761

Descriptors: (*Potassium, Corrosion), Niobium alloys, Refractory metal alloys, Tantalum, Molybdenum alloys.

N66-10702 Field 11F
CFSTI Prices: HC$4.00 MF$0.75
Thompson Ramo Wooldridge, Inc., Cleveland, Ohio. Materials Research and Development Dept.
GENERATION OF LONG TIME CREEP DATA OF REFRACTORY ALLOYS AT ELEVATED TEMPERATURES.
Quarterly rept. no. 9, 26 Jun-26 Sep 65,
by J. C. Sawyer. 8 Oct 65, 109p
Contract NAS3-2545
NASA CR-54773

Descriptors: (*Refractory metal alloys, Creep), Niobium, Tantalum, Molybdenum, Tungsten.

N66-10712 Field 11A
CFSTI Prices: HC$6.00 MF$1.25
Emerson Electric Co., St. Louis, Mo. Electronics and Space Div.
PERFORMANCE EVALUATION OF THERMO-LAG MATERIAL FOR ENTRY HEAT PROTECTION OF ADVANCED MANNED SPACECRAFT.
Material development rept., 1 Oct 62-1 Apr 63. 1963, 205p Rept. no. 1558
Contract NAS9-877
NASA CR-65166

Descriptors: (*Manned spacecraft, Atmosphere entry), High temperature research.

N66-10751 Field 11D
CFSTI Prices: HC$3.00 MF$0.75
Huyck Corp., Milford, Conn. Metals Dept.
PREPARATION AND EVALUATION OF FIBER METAL NICKEL BATTERY PLAQUES.
Final rept., 1 Aug 64-31 Jul 65,
by J. L. Bidler and J. I. Fisher. 1965, 80p
HUYCK-805/F3-25
Contract NAS3-6006
NASA CR-54777

Descriptors: (*Battery separators, Nickel).

N66-10876 Field 11F
CFSTI Prices: HC$1.00 MF$0.50
Du Pont De Nemours E. I. and Co., Aiken, S. C. Savannah River Lab.
STRESS CORROSION CRACKING OF TITANIUM ALLOYS.
Quarterly progress rept. no. 4, 1 Jan-31 Mar 65,
by M. R. Louthan, Jr., S. P. Rideout, and C. L. Selby. Sep 65, 24p DP/NASA/-1005
Contracts NASA Order-R-124, AT (07-2)-1
NASA CR-67710

Descriptors: (*Titanium alloys, Stress corrosion), Fracture (Mechanics).

N66-11228 Field 11A
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
INVESTIGATION OF RESINOUS MATERIALS FOR USE AS SOLAR CELL COVER GLASS ADHESIVE,
by J. G. Haynos. Sep 65, 19p NASA-TM-X-55333, X-716-65-369

Descriptors: (*Solar cells, Glass seals), (*Adhesives, Polymers), Glass.

N66-11243 Field 11A
CFSTI Prices: HC$2.00 MF$0.50
General Dynamics/Astronautics, San Diego, Calif.
PRODUCIBILITY OF POTTING COMPOUNDS,
by J. S. Cruzan. 1 Mar 64, 45p GD/A-BRW-64-005
Contract NAS3-3232
NASA CR-54800

Descriptors: (*Embedding substances, Production), (*Isocyanate plastics, Encapsulation), (*Sulfides, Encapsulation), Humidity, Aging (Materials), Environmental tests.

Identifiers: Polysulfides.

N66-11746 Field 11I
CFSTI Prices: HC$1.00 MF$0.50
Mellon Inst., Pittsburgh, Pa.
VISCOELASTIC BEHAVIOR OF POLYMERS AT LONG TIMES.
Semiannual rept. no. 9, 31 Oct 65,
by D. J. Plazek. 12 Nov 65, 3p
Grant NsG-147-61
NASA CR-68039

Descriptors: (*Polymers, Viscoelasticity), (*Molecular structure, Polymers).

N66-11747 Field 11F
CFSTI Prices: HC$3.00 MF$0.75
National Research Corp., Cambridge, Mass. Research Div.
STUDY OF THE MECHANISM OF ATMOSPHERIC INTERACTION WITH THE FATIGUE OF METALS.
Summary rept. 1 Jul 64-3 Aug 65,
by M. J. Hordon and M. E. Reed. 1965, 67p
Contract NASw-962
NASA CR-68036

Descriptors: (*Metals, Fracture (Mechanics)), Mechanical properties, Vacuum, Fatigue (Mechanics).

N66-12142 Field 11H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROLLING-CONTACT LUBRICATION STUDIES WITH POLYPHENYL ETHERS AT REDUCED PRESSURE,
by W. J. Anderson, R. J. Parker, and E. V. Zaretsky. Dec 65, 19p NASA-TN-D-3130

Descriptors: (*Lubricants, Ethers).

Identifiers: Polyphenyl ethers.

N66-12985 Field 11J
CFSTI Prices: HC$1.00 MF$0.50
Mellon Inst., Pittsburgh, Pa.
VISCOELASTIC BEHAVIOR OF POLYMERS AT LONG TIMES.
Semiannual rept. no. 9 for 31 Oct 65,
by D. J. Plazek. 1965, 3p
Grant NsG-147
NASA CR-68372

Descriptors: (*Polymers, Viscoelasticity), (*Viscoelasticity, Polymers), Rubber.

Patent 3,219,708 Field 11E
PROCESS FOR CROSS-LINKING CELLULOSE WITH FORMALDEHYDE ADDUCTS OF DIVINYL SULFONE.
Patent assigned to Agriculture,
by Clark M. Welch. 23 Nov 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Textiles, Processing), (*Cellulose, Crosslinking (Chemistry)), (*Crosslinking (Chemistry), Cellulose), Deformation, Stabilization, Formaldehyde, Organic sulfur compounds, Ketones, Catalysts, Polymerization, Fibers, Complex compounds, Patents.

Identifiers: Vinyl sulfones.

The addition products are useful in preparing cellulosic textiles having wrinkle resistance. The addition products of formaldehyde with divinyl sulfone are prepared by reacting formaldehyde with divinyl sulfone in the presence of an alkaline catalyst. The process eliminates the odor and inhalation toxicity problems normally associated with the use of divinyl sulfone.

Patent 3,222,149 Field 11E, 11D, 17D
METHOD FOR PRODUCING CONDUCTIVE GLASS FIBER YARN.
Patent assigned to Air Force,
by Warren W. Drummond. 7 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Glass textiles, Production), (*Composite materials, Fibers), (*Laminates, Glass textiles), (*Fibers, Glass textiles), Electrical conductance, Thermal conductivity, Wire, Foils, Polyester plastics, Films, Radar confusion reflectors.

Heat and electricity conductive strands, yarns and laminates are made by surrounding a metal core with glass fibers. The product may be used to produce heat conductive and electricity conductive fibers, fabrics, laminates and chaff counter measure material.

Patent 3,223,626 Field 11H
CORROSION INHIBITING RESIN-BONDED SOLID FILM LUBRICANT.
Patent assigned to Army,
by George P. Murphy, Jr. and Francis S. Mead. 14 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Corrosion inhibition, Lubricants), (*Lubricants, Preparation), Antimony compounds, Oxides, Molybdenum compounds, Sulfides, Magnesium compounds, Clay minerals, Binders, Epoxy plastics, Phenolic plastics, Organic solvents, O-heterocyclic compounds, Wear resistance, Patents.

Identifiers: Antimonous oxide, Bentonite, Dry-film lubricants, Dioxanes, Molybdenum disulfide.

The graphite-free lubricant has a long wear life and excellent corrosion protection. The composition is made by admixing antimony trioxide, molybdenum disulfide, magnesium bentonite and p-dioxane with an epoxy-phenolic resin system.

Patent 3,223,683 Field 11A, 11B
CROSS-LINKED POLY- AND INTERPOLY (AMIDEACETALS).
Patent assigned to Agriculture,
by Everett H. Pryde. 14 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Adhesives, Preparation), (*Laminated glass, Adhesives), (*Polyamide plastics, Cross linking (Chemistry)), (*Acetal plastics, Cross linking (Chemistry)), Alcohols, Organic nitrogen compounds, Aldehydes, Condensation reactions, Catalysts, Amines, Spiro compounds, Patents.

Identifiers: Poly (amide-acetals).

The products are useful as adhesives in laminating glass. Linear poly (amide-acetal) and interpoly (amideacetol) polymers are made in which both amide and integral parts of the polymer backbone. The linear polymers can be crosslinked by heating in the presence of a catalyst. In a typical embodyment, the pentaerythritol acetyl of methyl azelaaldehydate is condensed with hexamethylene diamine in the presence of catalytic amounts of magnesium oxide to yield a transparent substance that is exceptionally adherent to glass.

Patent 3,225,012 Field 11I, 11E
CARBOHYDRATE DERIVED POLYAMIDES.
Patent assigned to Agriculture,
by William A. P. Black, Eric T. Dewar and David Rutherford. 21 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Polyamide plastics, Preparation), (*Acrylic resins, Preparation), (*Vinyl plastics, Preparation), (*Carbohydrates, Polymers), Hexoses, Alcohols, Molecular rotation, Ethers, Stability, Fibers (Synthetic), Nylon, Optical filters, Patents.

Identifiers: Hexitols.

Optically active polymethacrylate polymers and other products are disclosed. Poly (1,6-dideoxy-1sebacamidogalactitol) is prepared by deacetonating poly (1,6-dideoxy-2,3:4,5-di-0-isopropylpylidene-1-sebacamidogalactitol) by heating at 100 degrees C. for 2 hours in a sealed tube containing an aqueous methanolic solution of 0.1 N hydrochloric acid.

Patent 3,225,016 Field 11I, 11E
NITROGEN-CONTAINING POLYMERS AND PREPARATION OF SAME.
Patent assigned to Air Force,
by Herbert K. Reimschuessel and Alan M. Lovelace 21 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Polymers, Triazines), (*Triazines, Polymerration), (*Plastics, Preparation), (*Fibers (Synthetic), Preparation), Phenyl ethers, Condensation reactions, Hydrazine, Ammonia, Films, Patents.

Identifiers: Phenyl bis (carbethoxyphenyl) diamino triazines.

The polymers are useful in adhesive applications, molding, casting, laminating, as film-forming materials and for other purposes. A film and fiber forming composition is a reaction product of a polycondensation reaction effected under heat at about 250 degrees C. for about 20 hours between 2-phenyl-N,N'-bis (4-carbethoxyphenyl) -4,6-diamino-s-triazine (I) and a mixture of hydrazine and ammonia, or for about 29 hours using I and hydrazine alone.

Patent 3,226,403 Field 11I, 11J
DIESTERAMIDE PLASTICIZERS.
Patent assigned to Agriculture,
by Frank C. Magne, Robert R. Mod and Evald L. Skau. 28 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Plasticizers, Amides), (*Amides, Plasticizers), Polyvinyl chloride, Cellulose acetates, Nitrile rubber, Additives, Esters, O-heterocyclic compounds, Fatty acid esters, Vegetable oils, Patents.

Identifiers: Bis (acetoxyethyl) epoxyoleamides.

The amides which form the plasticizer component of the resinous composition have the ability to plasticize both the hydrophilic and the hydrophobic type of resins and confer softening characteristics on nitrile rubbers. A product is N-bis (2-acetoxyethyl) epoxyoleamide. The diesteramides are particularly useful when added to vinyl chloride polymers and copolymers and to cellulose triacetate.

Patent 3,226,406 Field 11G, 11H, 6O
WAX ESTER SUBSTITUTE FOR JOJOBA OIL FROM THE SEED OF LIMNANTHES DOUGLASII.
Patent assigned to Agriculture,
by Thomas K. Miwa and Ivan A. Wolff. 28 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Vegetable oils, Preparation), (*Waxes, Preparation), Fatty acid esters, Separation, Plants (Botany), Tissue extracts, Alcohols, Hydrogenation, Drugs, Lubricants, Patents.

Identifiers: Limnanthes douglasii.

The invention involves the preparation from a hitherto untapped plant source of a liquid wax ester that is essentially indistinguishable from and that can be used in place of jojoba oil. The triglyceride oils are extracted from ground seed of Limnanthes douglasii, saponified to form the soaps, and acidified to obtain the free acids. Fatty alcohols corresponding to the essentially unsaturated Limnanthes fatty acids are obtained by sodium reduction of the triglycerides. The novel liquid wax esters were then prepared by a p-toluenesulfonic acid catalyzed reaction of the Limnanthes fatty acids with the corresponding fatty alcohols, equilibrium being prevented by constant removal of water of reaction. Hydrogenation of the obtained liquid wax esters yields the solid wax. (Extracted)

Patent 3,226,428 Field 11F
BISCARBAMATE-FORMALDEHYDE ADDUCTS.
Patent assigned to Agriculture,
by Sidney L. Vail, Clifford M. Moran and John D. Reid. 28 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Textiles, Additives), (*Organic nitrogen compounds, Textiles), (*Formaldehyde, Textiles), Fibers, Cotton textiles, Carbamic acids, Esters, Patents.

Identifiers: Carbamates, Methycol biscarbamates, Wrinkle-proofing agents.

Textile fabrics, composed mainly of cellulose, are treated with a new type of N-methylol biscarbamate treating agent, whereby the finished fabric acquires increased resiliency and wrinkle resistance. The fabrics may be laundered repeatedly by ordinary procedures.

RFP-544 Field 11F, 13H
CFSTI Prices: HC$1.00 MF$0.50
Rocky Flats Div., Dow Chemical Co., Denver, Colo.

METALLOGRAPHY OF WROUGHT VACUUM-CAST BERYLLIUM AT ELEVATED TEMPERATURES,
by V. R. Friebel. 22 Nov 65, 9p
Contract AT (29-1)-1106

Descriptors: (*Beryllium, Metallography), (*Heat treatment, Beryllium).

TID-21569 **Field 11F, 7D**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Coll. of Mineral Industries.
THERMODYNAMIC PROPERTIES OF SOLID SOLUTIONS AT HIGH TEMPERATURES.
Progress rept. 10 Jan-31 Dec 64,
by Arnulf Muan. 31 Dec 64, 24p
Contract AT (30-1)-2781

Descriptors: (*Solid solutions, Thermodynamics), (*Metallurgy, Solid solutions).

UCRL-13139 **Field 11I, 20K**
CFSTI Prices: HC$2.00 MF$0.50
R. T. Engineering Materials Research Lab., Brown Univ., Providence.
VISCOELASTIC PROBLEMSIN DESIGN.
Technical rept no. 2,
by W. N. Findley, K. Onaran, J. S. Y. Lai, C. A. Stanley and R. M. Reed. Sep 64, 34p EMRL-25
Contract W-7405-eng-48

Descriptors: (*Plastics, Viscoelasticity), (*Viscoelasticity, Plastics).

WAPD-TM-472 **Field 11F, 20B**
CFSTI Prices: HC$2.00 MF$0.50
Bettis Atomic Power Lab., Pittsburgh, Pa.
THERMAL EXPANSION AND PREFERRED ORIENTATION IN ZIRCALOY,
by J. J. Kearns. Nov 65, 39p
Contract AT (11-1)-GEN-14

Descriptors: (*Zirconium alloys, Thermal expansion), (*Single crystals, Zirconium alloys).

12. MATHEMATICAL SCIENCES

AD-452 952 **Field 12A, 9B**
CFSTI Price: HC$2.00
RCA Labs. Div., Radio Corp. of America, Princeton, N. J.
THRESHOLD FUNCTIONS THROUGH n= 7.
Scientific rept.,
by R. O. Winder. Oct 64, 47p Scientific-7
Contract AF19 (604)-8423,
Proj. AF-5632,
Task 563202
AFCRL 64-925

Descriptors: (*Special functions (Mathematical), Computer logic), (*Computer logic, Switching circuits), Mapping (Transformations), Bionics, Artificial intelligence.

Identifiers: Threshold functions.

This report is an enumeration of the 2470 self-dual eight-argument positive canonical threshold functions, each specified by its Chow parameters, each listed with its minimal 1-realization, and each accompanied by statistics on the number of extremals and iterations involved in its solution, together with a coded indication of its symmetry. The table is ordered lexicographically by the Chow parameters to facilitate test-synthesis by table look-up. (Author)

N66-10615 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
A STATISTICAL FORMULATION OF THE ESTIMATION AND THE COMBINED IDENTIFICATION AND CONTROL PROBLEMS. WORST CASE INITIAL CONDITION.
Quarterly rept. no. 5,
by R. Sridhar. Apr 65, 52p
Contract NAS7-100
NASA CR-67812
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-950670.

Descriptors: (*Nonlinear systems, Statistical analysis).

N66-10626 **Field 12A**
CFSTI Prices: HC$7.00 MF$2.00
Drexel Inst. of Tech., Philadelphia, Pa. Mathematics Dept.
METHODS FOR SYSTEMATIC GENERATION OF LIAPUNOV FUNCTIONS /PART ONE/,
by R. L. Drake. 1965, 380p
Contract NAS8-11196
NASA CR-67863

Descriptors: (*Control systems, Stability), Functions.

Identifiers: Liapunov function.

N66-10627 **Field 12A**
CFSTI Prices: HC$7.00 MF$1.75
Drexel Inst. of Tech., Philadelphia, Pa. Mathematics Dept.
METHODS FOR SYSTEMATIC GENERATION OF LIAPUNOV FUNCTIONS /PART TWO/.
by R. L. Drake. 1965, 321p
Contract NAS8-11196
NASA CR-67864

Descriptors: (*Stability, Theory), Functions, Control.

Identifiers: Liapunov functions.

N66-10653 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Stanford Univ., Calif. Dept. of Statistics.
R CHART CONTROL LIMITS BASED ON A SMALL NUMBER OF SUBGROUPS.
Technical rept. no. 83,
by F. S. Hillier. 4 Oct 65, 20p
Contract Nonr-225 (53)
NASA CR-67827

Descriptors: (*Statistical analysis).

N66-11216 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ON INTEGRATION OF HAMILTON- JACOBI PARTIAL DIFFERENTIAL EQUATION,
by A. Ghaffari. Aug 65, 16p NASA-TM-X-55321, X-513-65-314

Descriptors: (*Partial differential equations, Functions).

Identifiers: Hamilton-Jacobi equation, Legendre transform.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

PB-169 213 **Field 13L**
CFSTI Prices: HC$3.00 MF$0.75
Bureau of Public Roads, Washington, D. C.
HIGHWAY SAFETY RESEARCH ORGANIZATIONS AND RESOURCES IN THE UNITED STATES.
1965, 93p

Descriptors: (*Safety, Roads), (*Scientific organizations, Safety), Scientific research, United states, Bibliographies, Reports, Scientific personnel, Traffic.

AD-451 427 **Field 13K**
CFSTI Price: HC$7.60
NRC Equipment Corp., Newton, Mass.
DIFFUSION PUMP BAFFLE STUDY.
Technical documentary rept., 30 Jul 62-20 Apr 64,
by M. H. Hablanian. Nov 64, 71p
Contract AF 40 (600)-1009,
Proj. AF-7778,
Task AF-777801
AEDC TDR-64-253,
N65 12578

Descriptors: (*Diffusion pumps, Baffles), (*Baffles, Diffusion pumps), Ducts, Performance (Engineering), Space environmental conditions, Collecting methods, Test facilities, Vacuum apparatus, Low-pressure research, Low-temperature research, Conductivity.

This study was undertaken to develop and test a diffusion pumping station having maximum pumping speed consistent with minimum backstreaming for use on a large space environmental chamber. The complete system includes pump, duct, and baffle. Conductance measurements were made using small-scale model ducts and baffles to determine the most promising configuration for the full-scale system. As a result of this preliminary work, a 52 inch diameter liquid nitrogen cooled baffle was developed which has a transmission probability of 0.35 while the reducer duct-baffle combination developed retains 50 per cent of the pumping speed above the baffle. Backstreaming measurements ranged from 7.3 x 10 to the minus 7th power mg/sq cm for a short duration test (63 hours) to 7 x 10 to the minus 8th power mg/sq cm-min for a long duration test (524 hours). Along with the back-streaming measurements, the residual gas composition in the test dome was checked with a mass spectrometer residual gas analyzer. A lesser aspect of this study was to compare the backstreaming rates of two diffusion pump oils above a liquid nitrogen cooled baffle. The baffle was constructed to approximate the full-scale 52 baffle. (Author)

N66-10632 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio.
A STUDY TO DEVELOP A MECHANIZED WELDING PROCEDURE TO JOIN THICK-GAGE ALUMINUM ALLOY PLATE USING NARROW-GAP TECHNIQUES.
Final rept.,
by D. E. Conklin, D. C. Martin, R. P. Meister, andR. E. Monroe. 31 Jan 65, 78p
Contract NAS8-11102
NASA CR-67760

Descriptors: (*Aluminum alloys, Welding), (*Welding, Aluminum alloys).

Identifiers: Narrow gap welding.

N66-10701 **Field 13G**
CFSTI Prices: HC$1.00 MF$0.50
Bendix Corp., Southfield, Mich. Research Labs. Div.
FABRICATION AND TEST OF A FLUERIC POSITION SERVO.
Quarterly rept., 10 Jun-10 Sep 65.
1965, 20p BRLD-3133
Contract NAS3-6201
NASA CR-54776

Descriptors: (*Nuclear propulsion, Rocket motors), Pneumatic servomechanisms, Actuators.

N66-10930 **Field 13G, 9E**
CFSTI Prices: HC$2.00 MF$0.50
Parker Aircraft Co., Ls Angeles, Calif.
ELECTRO-PNEUMATIC ACTUATION SYSTEM.
Monthly progress rept. no. 7.
29 Jan 65, 34p
Contract NAS8-11662
NASA CR-67921

Descriptors: (*Actuators, Systems engineering), Synchros, Pneumatic systems, Electric motors, Torque.

N66-11233 **Field 13H**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
HANDLING, CLEANING, DECONTAMINATION AND ENCAPSULATION OF MOSFETS CIRCUITRY,
by F. N. Ledoux. Oct 65, 27p NASA-TM-X-55338, X-723-65-406

Descriptors: (*Circuits, Encapsulation), (*Cleaning, Circuits), Semiconductors, Metals, Oxides, Silicon.

N66-11744 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.50
Oklahoma State Univ., Stillwater. Research Foundation.
ESTIMATES OF ELECTRICITY SALES BY UTILITIES, BY COUNTY AND CLASS OF SERVICE, OKLAHOMA, 1950 AND 1960,
by L. Warner. 1964, 51p
Contract NAS-63 (04)
NASA CR-68041

Descriptors: (*Electric power production, Costs), (*Oklahoma, Electric power production), Economics.

N66-11761 **Field 13H**
CFSTI Prices: HC$4.00 MF$1.00
General American Transportation Corp., Niles, Ill. MRD Div.
NONDESTRUCTIVE TESTING FOR EVALUATION OF STRENGTH OF BONDED MATERIAL,
by L. Frank and G. Schmitz. Sep 65, 146p
Contract NAS8-11456
NASA CR-67983

Descriptors: (*Adhesives, Non-destructive testing), Welds, Stresses.

N66-12149 **Field 13G**
CFSTI Prices: HC$4.00 MF$1.00
Bendix Products Aerospace Div., Bendix Corp., South Bend, Ind.
PNEUMATIC NUTATOR ACTUATOR MOTOR.
Final rept.,
by G. R. Howland. 17 Oct 65, 142p BPAD-863-16719R
Contract NAS3-5214
NASA CR-54788

Descriptors: (*Actuators, Nuclear reactors), Hydraulic actuators, Control systems, Torque.

N66-12854 **Field 13H, 11F**
CFSTI Prices: HC$6.00 MF$1.50
Hughes Aircraft Co., Culver City, Calif. Aerospace Group.
DETERMINATION OF THE EFFECTS OF A THERMAL STERILIZATION PROCESS ON THE MECHANICAL AND ELECTRICAL PROPERTIES OF SOLDERED AND WELDED JOINTS.
Final rept.,
by F. Z. Keister. 9 Oct 65, 246p P-65-117
Contract NAS7-100
NASA CR-68153
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-951 069.

Descriptors: (*Welds, Heat treatment), (*Soldered joints, Heat treatment), Mechanical properties, Electrical properties.

Identifiers: Thermal sterilization.

PB-169 187 **Field 13D**
CFSTI Prices: HC$3.00 MF$0.50
Rock Island Arsenal, Ill.
AGING OF BARRIER MATERIALS.
6 Aug 52, 55p RIA-52-2804
Proj. TB4-672d-1
ATI 166 783

Descriptors: (*Packing materials, Aging (Materials)), (*Environmental tests, Packing materials), Laminates, Paper, Plastics, Degradation, Performance (Engineering), Specifications, Experimental data, Weatherproofing, Physical properties.

Barrier materials meeting the requirements of Joint Army and Navy Specification JAN-B-121 are investigated for their physical and chemical properties after exposure to the deteriorating influences of light, water, and heat in the Atlas Weatherometer. (Author)

PB-169 373 **Field 13B, 8H**
CFSTI Prices: HC$4.00 MF$0.75
Bureau of Reclamation, Denver, Colo. Technical Engineering Analysis Branch.
CANAL CAPACITY STUDIES; CONCRETE SECTIONS, MAIN CANAL (LONG LAKE REACH) COLUMBIA BASIN PROJECT.
1965, 90p DA-1

Descriptors: (*Inland waterways, Concrete), (*Concrete, Inland waterways), (*Civil engineering, Inland waterways), Fluid flow, Friction, Antifouling coatings, Engineering, Data, Hydrology, Washington.

Hydraulic tests were made on the concrete-lined sections of the Main Canal, Columbia Basin Project, Washington, in 1960, 1963, and 1964. Some of the data from the 1960 tests were analyzed and included in Bureau of Reclamation Technical Memorandum No. 661. All of these tests are summarized in this publication. The 4.5-mi test reach was designed for a flow of 9,700 cis on a slope of 0.0001. Design velocity was 5.77 fps, based on Nutter's 'N' of 0.014. The equivalent Manning's 'N' is 0.0146. Computed average values of Manning's 'N', based on test data, varied from about 0.014 in Mar ch to about 0.018 in August 1960. Estimated curve and pier losses were subtracted from measured losses for computing resistance coefficients. Tests conducted in 1963 and 1964 to determine effects of copper sulfate treatments on resistance caused by filamentous algae were not conclusive. (Author)

14. METHODS AND EQUIPMENT

AD-457 952 **Field 14E, 15G**
CFSTI Price: HC$2.00
Itek Corp., Lexington, Mass.
STUDY OF IMAGE-EVALUATION TECHNIQUES.
Interim engineering rept. no. 9, 15 Jul-15 Oct 64.
15 Oct 64, 50p Itek-9048-10
Contract AF33 (657)-9158
N65 18 410

Descriptors: (*Photographic reconnaissance, Mathematical models), (*Aerial reconnaissance, Photographic images), Camera lenses, Photographic film, Optical properties, Programming (Computers), Optical images, Photointerpretation, Data processing systems.

The ultimate goal of this program is the development of a mathematical model that will be useful in the specification, design, and performance testing of reconnaissance systems. At present, we are concentrating on the lens and film components of the photo-optical system. Our immediate tasks fall into two closely related categories: (1) the mathematical development of the model, and (2) the establishment of valid and suitably accurate means to measure or calculate the physical characteristics of the lenses and emulsions used. The major effort is being placed in the latter category, where the work is broadly separated into lens, emulsion, and system phases, with the emulsion studies receiving the most emphasis. The computer program is described which represents the first, or linear, phase of our mathematical model. One of the practical problems in the analysis of photographic images using microdensitometry is the smoothing of the trace data. The granular nature of the photographic image makes this a quite necessary part of the data reduction procedure. A simple algorithm has been devised which is applied to the numerical values of the equidistant samples of a microdensitometer trace. The theoretical and experimental phases are reported of our lens study program.

AD-458 368 **Field 14B, 20D**
CFSTI Price: HC$6.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
PERFORMANCE ANALYSIS OF THE APL HYPER- SONIC GUN TUNNEL,
by R. A. Makofski. Sep 64, 62p TG-608
Contract NOw-62-0604-c

Descriptors: (*Hypersonic wind tunnels, Performance (Engineering)), Design, Theory, Operation, Data.

Performance calculations for the APL hypersonic gun tunnel are presented. These calculations are limited to initial pump tube pressures of 1 atmosphere and temperatures of 290K. (Author)

AD-468 153 **Field 14E, 20F**
CFSTI Prices: HC$3.00 MF$0.75
IIT Research Inst., Chicago, Ill.
ANALYSIS OF OPTICAL WAVEFRONT DISTORTIONS CAUSED BY THE ATMOSPHERE.
Interim technical rept., 21 Apr-20 Jul 65,
by Anthony J. Montgomery. 30 Jul 65, 61p
IITRI-A6121-6
Contract AF33 (615)-2429,
Proj. IITRI-A6121
N65 34551

Descriptors: (*Aerial photography, Atmospheric refraction), (*Atmospheric refraction, Aerial photo graphy), Optical images, Photographic images, Distortion, Atmospheric motion, Optical phenomena, Measurement, Interferometers.

In order to obtain the optimum design of a wavefront shearing interferometer to measure optical wavefront distortions caused by the atmosphere, some preliminary experiments using a pointing interferometer have been considered. Use of a pointing interferometer would enable the shape of wavefront along the line of flight to be determined. A pointing interferometer, which at a later date could be modified very simply to measure wavefront distortion, had been constructed and preliminary measurements indicate that the technique could be used to measure changes in orientation of the wavefront of less than one arc second. The construction of a pointing interferometer for use in flight tests appears to be feasible. Interferograms of wavefront distortion, caused by artificially produced local air turbulence, indicate that dis-

tortion is absent over some short time intervals. Hence there would be no image degradation due to the turbulence, if the film were exposed during one of these intervals. The wavefront distortion is also shown to be much greater when the region of turbulence is in the vicinity of the interferometer as compared to near the source.

AD-468 342 Field 14B, 6S
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A MOBILE LABORATORY FOR GROUP HEARING TESTS.
Research rept.,
by J. R. Cox, R. W. Benson, and A. F. Niemoeller. 30 Nov 56, 18p
NM 001-102-502-3

Descriptors: (*Audiometry, Laboratories), (*Hearing, Test facilities), Design, Mobile, Jet engine noise, Naval personnel, Performance (Engineering), Acoustic insulation, Psychomotor tests, Aircraft carriers.

A mobile laboratory has been constructed as part of a Navy program to investigate both the auditory and the non-auditory effects (if any) of the noise exposure received by jet engine mechanics and members of the flight deck crew aboard aircraft carriers. The construction of the mobile laboratory was necessary to permit the measurement of auditory thresholds and performance on certain psychomotor tests under controlled environmental conditions. The mobile laboratory has proved to be a useful facility for making hearing measurements in the field. It is relatively easy to move about and the design has, on the whole, proved satisfactory. Some additional noise control will be necessary before the acoustical design is completely satisfactory. The group audiometer is capable of making comparisons between groups of men, and between before and after exposure tests taken on the same group of men. The audiometer is simple, fast, reliable, and not particularly costly. (Author)

BDX-613-39 Field 14B
CFSTI Prices: HC$2.00 MF$0.50
Bendix Corp., Kansas City, Mo.
MODERN GAGE CONTROL.
by Leo Tschechtelin. 1963, 40p CONF-630404-1
Contract AT (29-1)-613
Presented at the Annual Quality Control Conference, (3rd) Toledo 6 Apr 1963.

Descriptors: (*Meters, Quality control), (*Instrumenta tion, Meters).

C13.10-271 Field 14B, 5B
CFSTI Price: MF$1.25
National Bureau of Standards, Washington, D. C.
GUIDE TO INSTRUMENTATION LITERATURE,
by Julian F. Smith and W. G. Brombacher. 7 Jul 65, 227p NBS Miscellaneous pub-271
Availability: Supersedes PB-122 145. Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.25.

Descriptors: (*Instrumentation, Documentation), (*Documentation, Instrumentation), Bibliographies, Indexes, Periodicals, Reports, Engineering.

This compilation is a source list of instrumentation literature, with a subject index and an index of personal and Corporate authors.

N66-10616 Field 14B
CFSTI Prices: HC$3.00 MF$0.75
Honeywell, Inc., Minneapolis, Minn. Aeronautical Div.
G G159 MINIATURE INTEGRATING GYRO STERILIZATION EXPOSURE STUDIES AT 300 DEG F.
Final rept.,
by R. G. Baldwin. 10 Sep 65, 80p
Contract NAS7-100
NASA CR-67810
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-950769.

Descriptors: (*Gyroscopes, Gas bearings), (*Gas bearings, Gyroscopes).

N66-10633 Field 14A
CFSTI Prices: HC$2.00 MF$0.50
Alfred P. Sloan School of Management. Massachusetts Inst. of Tech., Cambridge.
RESEARCH PROGRAM ON THE ORGANIZATION AND MANAGEMENT OF RESEARCH AND DEVELOPMENT. QUESTIONING THE COST/EFFECTIVENESS OF THE R AND D PROCUREMENT PROCESS,
by E. B. Roberts. Sep 65, 27p
Grant NsG-235
NASA CR-67766

Descriptors: (*Procurement, Research program administration).

N66-10635 Field 14A
CFSTI Prices: HC$2.00 MF$0.50
Alfred P. Sloan School of Management, Mass. Inst. of Tech., Cambridge.
RESEARCH PROGRAM ON THE ORGANIZATION AND MANAGEMENT OF R AND D. PROBLEM SOLVING STRATEGIES IN PARALLEL RESEARCH AND DEVELOP- MENT PROJECTS,
by T. J. Allen. Jun 65, 28p
Grant NsG-235
NASA CR-67767

Descriptors: (*Research program administration).

N66-10882 Field 14B, 20F, 9F
CFSTI Prices: HC$5.00 MF$1.00
Ohio State Univ. Research Foundation, Columbus. Dept. of Electrical Engineering.
AN INTERFEROMETRIC RECEIVER FOR SUBMILLIMETER RADIOMETRY,
by R. A. Williams. 1 Feb 65, 163p Rept. no. 1093-25
Grant NsG-74-60
NASA CR-67704

Descriptors: (*Radiometers, Submillimeter waves), Interferometers.

N66-10936 Field 14B, 20F
CFSTI Prices: HC$1.00 MF$0.50
National Bureau of Standards, Washington, D. C.
ACCURATE REFLECTANCE MEASUREMENTS. ELLIPSOIDAL MIRROR REFLECTOMETER.
Jun 65, 5p STR-3186
Contract NASA Order-R-09-022-032
NASA CR-67930

Descriptors: (*Reflectometers, Test equipment), Materials.

N66-11200 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
SOME FABRICATION TECHNIQUES OF SPECTRAL LAMPS AND GAS ABSORPTION CELLS FOR RUBIDIUM MAGNETOMETERS,
by H. L. Hoyt. Jun 65, 19p NASA-TM-X-55304, X-612-65-235

Descriptors: (*Magnetometers, Rubidium), Alkali metals, Gases.

Identifiers: Spectral lamps, Gas absorption cells.

N66-11204 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
DYNAMIC SOLAR CELL POWER SYSTEM SIMULATOR,
by J. Paulkovich. 17 Jun 65, 20p NASA-TM-X-55308, X-636-65-259

Descriptors: (*Solar cells, Power supplies), (*Power supplies, Simulation), Diodes, Silicon.

N66-11205 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
SOLID STATE AMPERE HOUR INTEGRATOR,
by J. Paulkovich. Jul 65, 15p NASA-TM-X-55309, X-636-65-262

Descriptors: (*Integrators, Batteries + components), (*Frequency converters, Batteries + components), Solid state physics, Spacecraft.

N66-11215 Field 14B
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
MICROBIAL PROFILE OF LAMINAR FLOW CLEAN ROOMS,
by E. M. Powers. Sep 65, 46p NASA-TM-X-55320, X-600-65-308

Descriptors: (*Spacecraft cabins, Contamination), Capsules, Spacecraft, Microorganisms, Viability.

N66-11223 Field 14C
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
A SYSTEM FOR AUTOMATIC ACCUMULATION OF RADIATION DATA,
by N. E. Reid. Aug 65, 10p NASA-TM-X-55328, X-716-65-349

Descriptors: (*Semiconductor devices, Radiation damage), Cobalt, Data, Radiation measurement systems.

N66-11670 Field 14B
CFSTI Prices: HC$1.00 MF$0.50
Hawaii Univ., Honolulu. Dept. of Physics.
STIGMATIC SPECTROGRAPH STUDY.
Quarterly status rept. nos. 16-17, 1 Jan-30 Jun 65, by H. C. Mo Allister. 1965, 24p
Contract NASR-5
NASA CR-68032

Descriptors: (*Servomechanisms, Tests), Mechanical engineering, Electronic equipment.

Identifiers: Stigmatism.

N66-11743 Field 14B
CFSTI Prices: HC$6.00 MF$1.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
A FEASIBILITY STUDY OF THE MASS SPECTROMETER INSTRUMENTATION FOR THE ANALYSIS OF THE MARTIAN ATMOSPHERE.
Final rept.,
by W. J. Whistler. 7 Sep 62, 277p JPL-950327
Contract NAS7-100
NASA CR-67959

Prepared in cooperation with Consolidated Systems Corp., Monrovia, Calif.

Descriptors: (*Planetary atmospheres, Mass spectroscopy), (*Mars, Atmosphere), Instrumentation.

N66-11760 **Field 14E**
CFSTI Prices: HC$4.00 MF$1.00
California Univ., Berkeley. School of Forrestry.
A MULTISPECTRAL PHOTOGRAPHIC EXPERIMENT BASED ON A STATISTICAL ANALYSIS OF SPECTROMETRIC DATA.
Final rept.,
by R. N. Colwell, D. T. Lauer, W. C. Draeger, andG. A. Thorley. 30 Jun 65, 137p
Grant NGR-05-003-080
NASA CR-68001

Descriptors: (*Data, Statistical analysis), (*Statistical analysis, Data), (*Terrain, Photographic analysis).

N66-12126 **Field 14B**
CFSTI Prices: HC$4.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Space Power and Propulsion Section.
POTASSIUM CORROSION TEST LOOP DEVELOPMENT.
Quarterly progress rept. no. 7, 15 Jan-15 Apr 65,
by E. E. Hoffman. 1965, 107p
Contract NAS3-2547
NASA CR-54735

Descriptors: (*Potassium, Corrosion), Refractory metal alloys, Boiling.

N66-12175 **Field 14B**
CFSTI Prices: HC$1.00 MF$0.50
Chicago Univ., Ill. Dept. of Biophysics.
ELECTRON MICROSCOPY WITH SUPERCONDUCTING LENSES,
by H. Fernandez-Moran. 1965, 10p
Contract AT/30-1/-1344, Grant NsG-441-63
NASA CR-68278
Prepared in cooperation with Natl. Ints. of Health, Bethesda, Md. Grants PHS-NB-04267, PHS-CM-13243.

Descriptors: (*Electron microscopy, Electromagnetic lenses), (*Electromagnetic lenses, Superconductors).

N66-12191 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Wyle Labs., Inc., Huntsville, Ala. Testing Div.
THE EFFECTS UPON SHOCK MEASUREMENTS OF LIMITED FREQUENCY RESPONSE INSTRUMENTATION,
by M. V. Crocker and L. C. Sutherland. Jan 65, 35p WR-65-1
Contract NAS8-11217
NASA CR-68216

Descriptors: (*Shock waves, Measurement), (*Test equipment, Shock waves), Attenuation, frequency, Instrumentation.

N66-12858 **Field 14D, 4A**
CFSTI Prices: HC$1.00 MF$0.50
Pennsylvania State Univ., University Park. Ionosphere Research Lab.
ROCKET INSTRUMENTATION FOR THE MEASUREMENT OF D-REGION ELECTRON DENSITY AND COLLISION FREQUENCIES.
Scientific rept. no. 244,
by D. J. Hoffman, J. S. Nisbet, and T. A. Seliga. 1 Jul 65, 25p
Contract AF 19 (628)-4050, Grant NsG-134-61
NASA CR-67957,
AFCRL 65-673

Descriptors: (*Electron density, Atmospheric sounding), (*Sounding rockets, Instrumentation), Ionosphere.

Identifiers: Black brant.

PB-169 333 **Field 14B, 20F, 20N**
CFSTI Prices: HC$2.60 MF$0.50
Coast and Geodetic Survey, Rockville, Md.
COMPARISON TESTS OF ELECTRO-OPTICAL AND MICROWAVE DISTANCE MEASURING INSTRUMENTS,
by Buford K. Meade. 1965, 22p
Presented at the United Nations Regional Cartographic Conference for Asia and the Far East (4th), Manila, November 21-December 5 1964.

Descriptors: (*Distance-measuring equipment, Electrooptics), (*Electrooptics, Distance-measur ing equipment), (*Microwave equipment, Distance measuring equipment), Geodesics, Instrumenta tion, Calibration.

Identifiers: Geodimeters.

The results of tests performed to evaluate accuracies of the Models 2A and 4D Geodimeter are presented.

PB-169 368 **Field 14B, 19A**
CFSTI Prices: HC$3.60 MF$0.50
Diamond Ordnance Fuze Labs., Washington, D.C.
MEASUREMENT OF PARTICLE SIZE OF COMPONENTS OF GASLESS MIXTURES,
by R. H. Comyn, Mardelle L. Couch andR. E. McIntyre. 28 Aug 58, 36p Rept. no. TR-636
Proj. DOFL-30131
AD 206 746

Descriptors: (*Particle size, Measurement), Powders, Mixtures, Test methods, Experimental data, Pyrotechnics.

The relationships between the blending and burning characteristics of gasless mixtures and the particle size of their ingredients are discussed in detail. Particle size methods used in current pyrotechnic specifications are shown to be inadequate for controlling the size of the ingredients of gasless mixtures. A number of known particle size methods are reviewed and their applicability to gasless mixtures are considered. Two methods are recommended for measuring the particle sizes of ingredients of gasless powders: The BrunauerEmmit-Teller (B.E.T.; nitrogen adsorption) method for determining total surface area, and the Eagle-Picher Turbimetric method for measuring particle size distribution. (Author)

PB-169 372 **Field 14E**
CFSTI Prices: HC$5.60 MF$0.50
Information Dynamics Corp., Wakefield, Mass.
STUDY OF NIMBUS SATELLITE PHOTOGRAPH ARCHIVES SYSTEM REQUIREMENTS FOR UNITIZED MICROFORM.
Final rept.
Feb 63, 55p IDC-R-1101-1

Descriptors: (*Photographic recording systems, Information retrieval), (*Information retrieval, Aerial photographs), (*Aerial photographs, Information retrieval), Meteorological satellites, Cloud cover, Photographs, Data storage systems, Weather communications, Documentation.

Identifiers: Nimbus.

This report presents a discussion and analysis of user communities and their needs; a description of the preliminary systems design encompassing both NWSC and NWRC operations; and detailed consideration of the proposed systems design in areas of typical equipment, materials, production rates, capital investment, operating costs, and the quality of output from the system at various stages.

SC-M-64-61 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Sandia Corp, Albuquerque, N. Mex.
SANDIA CORPORATION (ORGANIZATION 7300) ENVIRONMENTAL FACILITY CALIBRATION PROCEDURES,
by E. M. Bauer. Aug 64, 50p

Descriptors: (*Environmental tests, Test facilities), (*Test facilities, Calibration), Test methods, Standards, Temperature, Humidity, Pressure, Shock (Mechanics), Vibration, Acceleration.

Y-EA-37 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Union Carbide Corp., Oak Ridge, Tenn. Y-12 Plant.
SIGNIFICANT PARAMETERS OF CLEAN ROOM DESIGN.
by E. E. Choat and J. C. Little. 24 Mar 65, 39p
CONF-650533-1
Contract W-7405-eng-26
To be presented at the American Assn., on Contamination Control, Annual Meeting, Miami, Fla., 26 May 1965.

Descriptors: (*Clean rooms, Construction), (*Nuclear physics laboratories, Clean rooms).

16. MISSILE TECHNOLOGY

AD-459 593 **Field 16D**
CFSTI Price: HC$25.80
Vought Aeronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
ENGINEERING INVESTIGATION AND TESTS WHICH FURTHER SUBSTANTIATE SYSTEM FEASIBILITY AND PROVIDE DATA RELATIVE TO THE DEVELOPMENT OF A NUCLEAR LOW ALTITUDE SUPERSONIC VEHICLE. PART II. TECHNICAL INFORMATION. VOLUME 9. NUCLEAR RADIATION EFFECTS TEST NO. 10, FLYAWAY.
Rept. for 1 Oct 63-31 Dec 64.
Dec 64, 262p
Contract AF 33 (657)-12517
ASD TR-64-91-pt-2-Vol-9

Descriptors: (*Guided missiles (surface to surface), Low altitude), Cruise missiles, Supersonic flight, Radar equipment, Auxiliary power plants, Magnetrons, Thyratrons, Pulse modulation, Ferrites, Pre amplifiers, Generators, Gyroscopes, Accelerometers, Command + control systems, Tunnel diodes, Electronic equipment, Radiation effects, Radiation damage, Nuclear reactors, Neutrons, Gamma rays, Guided missile computers, Cartridges (PAD), Auxiliary power plants, Dosimeters.

A series of radar components, a secondary power unit, several flight test instrumentation sensors, several advanced computer components, and portions of a command control subsystem were exposed to nuclear radiation levels exceeding 5 x 10 to the 15th power fast neutrons /sq cm and a gamma exposure of 5 x 10 to the 10th power ergs/gm- (C). Dynamic test data recorded before, during, and after the irradiation are presented for magnetrons, high power metal-ceramic hydrogen thyration tubes, pulse modulators, microwave ferrite devices, preamplifiers, a turbine-generator unit, rate gyros, accelerometers, portions of a command control receiver and decoder, tunnel diodes, thin film parametron elements, and circuitrons. (Author)

AD-459 663 **Field 16D**
CFSTI Price: HC$22.00
Vought Aeronautics Div., Ling-Temco-Vought, Inc., Dallas, Tex.
ENGINEERING INVESTIGATION AND TESTS WHICH FURTHER SUBSTANTIATE SYSTEM

FEASIBILITY AND PROVIDE DATA RELATIVE TO THE DEVELOPMENT OF A NUCLEAR LOW ALTITUDE SUPERSONIC VEHICLE. PART II. TECHNICAL INFORMATION. VOLUME 10. NUCLEAR RADIATION EFFECTS TEST NO. 18, FLYAWAY.
Rept. for 1 Oct 63-31 Dec 64.
Dec 64, 224p
Contract AF 33 (657)-12517
ASD TR-64-91-Pt-2-Vol-10
See also AD-459 593.

Descriptors: (*Guided missiles (Surface to surface), Low altitude), Feasibility studies, Supersonic flight, Cruise missiles, Nuclear reactors, Aircraft nuclear propulsion, Ramjet engines, Radiation effects, Models (Simulation), Flight control systems, Digital computers, Magnetic cores, Inertial guidance, Gyroscopes, Accelerometers, Electronic equipment, Circuits, Hardening, Performance (Engineering), Neutrons.

Planning and execution of the irradiation provided specific test data on subsystems, components, and materials representative of those which would be used in a nuclear powered ramjet missile. The test articles evaluated were the product of an extensive development program to provide nuclear radiation tolerant subsystems which would meet the LASV-N performance characteristics. The test articles representing the major subsystem areas (digital computer simulator, A to D shaft position encoder, magnetic core controlled multiplexer, two axis inertial platform subsystem, rate gyros and accelerometers, and electromechanical filter system) were dynamically irradiated during a total exposure of 187 Mw-hrs. (Author)

AD-467 001 **Field 16B, 17H**
CFSTI Prices: HC$3.00 MF$0.50
Device Development Corp., Waltham, Mass.
DATA REDUCTION OF CHEMICAL RELEASES IN THE UPPER ATMOSPHERE OF LOW-INTENSITY OPTICAL EMISSIONS CAUSED BY THE RELEASES AND DESIGN AND DEVELOPMENT OF PAYLOADS TO PRODUCE LUMINARY TRAIL AND POINT RELEASES AT ALTITUDES ABOVE 80 KM.
Final rept., 15 Jul 62-15 Oct 64,
by Eckart Gusovius and R. B. Holt. 15 Nov 64, 55p 1642-F
Contract AF19 (628)-1642,
Projs. AF-4984, AF-7635,
Tasks 498401, 763506
AFCRL 65-136

Descriptors: (*Guided missile tracking systems, Optical tracking), (*Atmospheric sounding, Pyrotechnics), (*Pyrotechnics, Atmospheric sounding), (*Optical tracking, Guided missile tracking systems), Sounding rockets, Payload, Pyrotechnic projectors, Wind, Flow visualization, Markers.

Identifiers: Firefly project.

Two areas of effort are contained in this report. The first covers data acquisition and reduction. The second covers payload design and development. A description of data acquisition instrumentation for Firefly III is set forth. This equipment included various types of camera and photomultiplier arrays. The data processing programs and their operation are described in detail. Studies of wind phenomena between 80 and 130 kilometers was permitted by Firefly III data. A discussion of the conclusions is included. The payload section of the report describes the several models of payloads which have been developed and flown. The special characteristics to provide specific releases are outlined as well as the chemical compositions used. (Author)

N66-10756 **Field 16B, 17G**
CFSTI Prices: HC$4.00 MF$0.75
Space Technology Labs., Inc., Redondo Beach, Calif.
MISSILE DYNAMICS FOR STABILITY ANALYSIS. VOLUME I. DERIVATION OF EQUATIONS,
by J. L. Palmer. 9 Jul 63, 103p STL-8414-6046-TU-000
Contract NAS3-3231
NASA CR-67681

Descriptors: (*Guided missiles, Stability), (*Equations, Guidance), Analysis, Stabilization.

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERE

AD-265 898 **Field 17B, 9E**
CFSTI Price: HC$1.00
Michigan Univ., Ann Arbor. Infrared Lab.
A PHOSPHOR-BELT DISPLAY SYSTEM FOR PROVIDING AN ENDLESS RASTER LINE SCAN,
by S. Nudelman, G. Trytten, and J. Hickmott.
Oct 61, 15p Rept. no. 2900-292-T
Contract DA-36-039-sc-78801,
Proj. MICHIGAN

Descriptors: (*Television display systems, Scanning), Phosphorescent materials, Modulators, Light, Airborne, Display systems.

A luminescent display device suitable for operation with airborne sensors that provide an endless raster line scan has been assembled and tested. It consists of a continuously moving flexible plastic belt coated with a long-decay photoluminescent phosphor, and an ultrasonic ultraviolet light modulator. The phosphor is excited to luminescence by the video-modulated ultraviolet light spot. An image is formed by sweeping the light spot perpendicular to the direction of belt motion. The system has zero flyback time and provides an instantaneous in-flight examination of data for the image of a flight path. The phosphorbelt light output is also sufficient to permit image reproduction on a Lumicon TV-type of display, and is well suited to operation as an integral part of a sensor system, or at a distance by a communication link. (Author)

AD-444 071 **Field 17I, 20I**
CFSTI Price: HC$1.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
THE RADAR ABSORPTION EFFECT CAUSED BY VERY THIN PLASMA SHEATHS.
Contract technical note,
by H. M. Musal, Jr. and W. E. Blore. Jul 64, 21p CTN64-02
Contract DA-04-495-ORD-3567 (Z), ARPA Order-357-63

Descriptors: (*Radar interference, Plasma sheath), (*Plasma sheath, Reentry vehicles), Radar track ing, Atmosphere entry, Diffraction, Flow fields.

The radar absorption effect was observed in full scale reentry vehicle tests and in laboratory and field studies of hypersonic vehicle flow field observables. The usual manifestation of this effect is the drastic reduction of the radar cross section of the vehicle and its associated flow field under certain conditions. Ballistic range studies of this effect have shown significantly large absorption to occur for even very thin plasma sheaths. This is inexplicable in terms of the theory that explains the full scale vehicle results. An advanced theory is presented, which has the potential for explaining the anomalous absorption caused by very thin plasma layers covering blunt metallic bodies. This theory is applied to predict the anomalous absorption observed in ballistic range studies. The large amount of absorption observed experimentally is correctly predicted by this theory, but an accurate verification of all the details of the behavior as a function of ambient air density and body speed awaits more extensive and detailed flow field computations.

AD-449 823 **Field 17I, 20I**
CFSTI Price: HC$1.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
MILLIMETER RADAR INSTRUMENTATION FOR STUDYING PLASMA EFFECTS ASSOCIATED WITH HYPERSONIC FLIGHT.
Technical rept.,
by H. M. Musal, Jr., R. I. Primich, W. E. Blore, andP. E. Robillard. Aug 64, 20p TR64-02J
Contract DA-04-495-ORD-3567 (Z), ARPA Order-357-63

Descriptors: (*Radar equipment, Probes (Elec tromagnetic)), (*Plasma sheath, Hypersonic flight), (*Radar interference, Plasma sheath), Doppler radar, Millimeter waves.

Millimeter wavelength radars are used to study the plasma effects associated with the ionized flow fields of projectiles launched at hypersonic speeds into a free-flight ballistic range. Two CW doppler radars, which operate at frequencies of 35 and 70 Gc, are used to measure the nose-on backscattering radar cross sections of projectiles during their flight. The design and performance of the two radars, which operate simultaneously through a wire-grid beam splitter, are described in detail. The purpose of this millimeter radar instrumentation is to measure the changes and that occur in the radar cross sections of hypersonic projectiles caused by their highly ionized flow fields.

N66-10690 **Field 17G**
CFSTI Prices: HC$2.00 MF$0.50
Philco Corp., Palo Alto, Calif.
THE SCHEDULE OF MEASUREMENTS FOR ANALYSIS OF AN ONBOARD NAVIGATION SYSTEM,
by P. J. Rohde. 15 Oct 65, 49p
Contract NAS8-11198
NASA CR-61107

Descriptors: (*Navigation, Instrumentation), Scheduling.

N66-10691 **Field 17B**
CFSTI Prices: HC$3.00 MF$0.75
Research Triangle Inst., Durham, N. C.
A STUDY OF THE EFFECTS OF INTERFERENCE ON NARROW-BAND PHASE LOCK LOOPS.
Final rept.,
by P. G. Smith. 15 Oct 65, 94p
Contract NAS1-5065
NASA CR-66036

Descriptors: (*Tracking, Instrumentation).

N66-10884 **Field 17G**
CFSTI Prices: HC$5.00 MF$1.00
Perkin-Elmer Corp., Norwalk, Conn. Electro-Optical Div.
INFLUENCE OF ATMOSPHERIC TURBULENCE ON AZIMUTH LAYING TECHNIQUES.
Final technical summary rept.,
by M. Leen. 15 Jun 65, 163p
Contract NAS8-11142
NASA CR-67769

Descriptors: (*Guidance, Atmosphere motion), (*Optical equipment, Atmosphere motion), Guided missiles.

N66-11199 **Field 17I**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
APOLLO ENTRY RADAR ACQUISTION STUDY,
by J. R. Moore. 28 May 65, 39p NASA-TM-X-55303, X-513-65-225

Descriptors: (*Atmosphere entry, Radar tracking), (*Radar tracking, Blackout (Electromagnetic), Ionization.

Identifiers: Command module.

N66-11235 **Field 17B**
CFSTI Prices: HC$5.00 MF$1.25
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ANALYSIS OF US - USSR COMMUNICATIONS EXPERIMENTS CONDUCTED BETWEEN JODRELL BANK OBSERVATORY, UK, AND ZIMENKI OBSERVATORY, USSR, VIA THE ECHO II SATELLITE.
Jan 65, 202p NASA-TM-X-55343, X-724-65-466

Descriptors: (*Communication satellites (Passive), USSR), (*Wave transmission, Communication satellites (Passive).

Identifiers: ECHO II, Jordell Bank Observatory, Zimenski Observatory.

N66-13010 **Field 17B**
CFSTI Prices: HC$4.00 MF$0.75
Hughes Research Labs., Malibu, Calif.
ROUTING AND ECONOMIC PRINCIPLES OF MULTIPLE ACCESS SATELLITE COMMUNICATION,
by S. G. Lutz. Apr 64, 109p Rept. no. 303
Contract NASw-495
NASA CR-68296

Descriptors: (*Communication Satellites (Active), Economics), (*Economics, Communication sat ellites (Active).

PB-169 195 **Field 17G, 1E**
CFSTI Prices: HC$2.00 MF$0.50
Burroughs Corp., Paoli, Pa. Control Instrument Div.
GUIDE-LITE HELIPORT SYSTEM.
Final rept.,
by Eugene T. Hain. Dec 65, 42p
Contract FA-WA-4534,
Proj. FAA-430-206-01E
SRDS RD-65-57

Descriptors: (*Approach lights, Heliports), (*Heliports, Approach lights), (*Landing aids, Helicopters), Air traffic control terminal areas, Glide path systems, Velocity.

A detailed description is given of the design and construction of a ground-based visual landing aid for helicopters. The purpose of the device is to identify the landing site and indicate the proper landing path and approach velocity. The unit is operational and will be flight tested and evaluated by the FAA. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

ACNP-64545 **Field 18L**
CFSTI Prices: HC$2.00 MF$0.50
Allis-Chalmers Mfg. Co. Atomic Energy Div. Bethesda, Md.
LA CROSSE BOILING WATER REACTOR FINAL PHYSICS DESIGN REPORT,
by M. P. Lowenfeld and M. F. Ross. May 64, 32p
Contract AT (11-1)-654

Descriptors: (*Boiling water reactors, Reactor cores), (*Reactor cores, Reactor start-up sources).

AD-466 696 **Field 18E, 13J**
CFSTI Prices: HC$7.00 MF$1.50
Bechtel Corp., San Francisco, Calif.
RESEARCH AND DEVELOPMENT STUDY FOR DEEP OCEAN REACTOR PLACEMENT.
Final rept.
May 65, 307p
Contract NBy-32273
Prepared in cooperation with M. Rosenblatt and Son, Inc.

Descriptors: (*Nuclear reactors, Ocean bottom), (*Nuclear power plants, Ocean bottom), (*Marine engineering, Nuclear power plants), Installation, Construction, Ships, Foundations (Structures), Sea water, Recovery, Anchors (Marine), Cables (Mechanical).

study presents a survey of the various means by which an object weighing over a hundred tons can be lowered to the ocean floor (20,000 feet), monitored, and retrieved. Two basic systems, their major subsystems, and alternate modes of operation are discussed, analyzed, and evaluated. The All-Surface System accomplishes the required tasks from the surface of the sea. The Vehicle-Assisted System utilizes submersible work vehicles. The approximate costs of these two systems are compared and a composite system is recommended which is considered the best from the standpoints of flexibility and practicality. The Appendixes include studies on nuclear considerations; a discussion of long lines including rods, pipes, ropes, and chains; a parametric study of deep diving vehicles, and an analysis of the variation in sea water density and load volumes as applied in this study. (Author)

ANL-6865 **Field 18I, 18J, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
TERMINAL REPORT FOR THE MARK IV (PLUTON- IUM) LOADING IN EBR-I,
by R. R. Smith, C. B. Doe, and R. O. Haroldsen.
Apr 65, 92p
Contract W-31-109-eng-38

Descriptors: (*Breeding reactors, Experimental data), (*Reactor fuels, Plutonium).

Identifiers: Mark IV.

ANL-6974 **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill.
PHASE STUDIES OF U20W/O PU-FS ALLOYS,
by Owen L. Kruger. May 65, 44p
Contract W-31-109-eng-38

Descriptors: (*Reactor fuel processing, Metallogra phy), (*Phase studies, Reactor fuels).

Identifiers: Fissium.

ANL-7053 **Field 18I, 20D**
CFSTI Prices: HC$4.00 MF$0.75
Argonne National Lab., Ill.
PROPAGATION OF DENSITY DISTURBANCES IN AIR-WATER FLOW.
Doctoral thesis,
by George P. Nassos. Jun 65, 115p
Contract W-31-109-eng-38

Descriptors: (*Boiling water reactors, Hydro dynamics), (*Two-phase flow, Boiling water reactors).

ANL-7105 **Field 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, SEPTEMBER 1965.
20 Oct 65, 93p
Contract W-31-109-eng-33

Descriptors: (*Liquid metal cooled reactors, Reactor fuels), (*Reactor materials, Nuclear engineering).

ANL-7115 **Field 18I, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM PROGRESS REPORT, OCTOBER 1965.
23 Nov 65, 93p
Contract W-31-109-eng-38

Descriptors: (*Liquid metal cooled reactor, Reactor fuels), (*Reactor materials, Nuclear engineering).

ANL-7117 **Field 18I, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
INSPECTION, EVALUATION, AND OPERATION OF THE EBWR REACTOR VESSEL,
by N. Balai, C. R. Sutton, and E. A. Wimunc. Nov 65, 58p
Contract W-31-109-eng-38

Descriptors: (*Pressure vessels, Boiling water reactors), (*Boiling water reactors, Operation).

APEX-700 **Field 18J**
CFSTI Prices: HC$3.00 MF$1.00
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
MEASURED GAMMA SPECTRA BEHIND VARIOUS THICKNESSES OF BERYLLIUM, BERYLLIUM OXIDE, AND LITHIUM HYDRIDE,
by Paul W. Schreiber. Jun 61, 95p
Contract AF33 (600)-38062

Descriptors: (*Gamma-ray spectra, Reactor shielding materials), (*Reactor shielding materials, Gamma-ray spectra).

BMI-1748 (Del.) **Field 18J, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING OCTOBER 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 Nov 65, 36p
Contract W-7405-eng-92

Descriptors: (*Reactor materials, Scientific research), (*Nuclear industrial applications, Scientific research).

BNWL-137 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
A HIGH TEMPERATURE CREEP MACHINE FOR IN-CELL OPERATION,
by D. H. Nyman, M. R. Keegan, and J. A. Williams. Sep 65, 8p
Contract AT (45-1)-1830

Descriptors: (*Reactor materials, Creep), (*Creep, High-temperature research).

BNWL-139 **Field 18G, 7A**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
RESEARCH AND DEVELOPMENT ACTIVITIES FIXATION OF RADIOACTIVE RESIDUES.
Quarterly progress rept., Apr-Jun 65,
by A. M. Platt. Sep 65, 36p
Contract AT (45-1)-1830

Descriptors: (*Radioactive waste, Processing).

BNWL-149 **Field 18H, 18I, 18J, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PHYSICS RESEARCH QUARTERLY REPORT, APRIL-JUNE 1965.
15 Jul 65, 71p
Contract AT (45-1)-1830

Descriptors: (*Reactor lattice parameters, Nuclear engineering), (*Reactor materials, Critical assemblies).

BNWL-152 **Field 18I, 18J, 18K**
CFSTI Prices: HC$2.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
PHOENIX FUEL PROGRAM PROGRESS REPORT, FY-1965,
by P. L. Hofmann. 15 Aug 65, 26p
Contract AT (45-1)-1830

Descriptors: (*Reactor fuels, Plutonium), (*Power reactors, Reactor fuels).

BNWL-161 **Field 18F, 18J**
CFSTI Prices: HC$1.00 MF$0.50
Battelle-Northwest, Richland, Wash. Pacific Northwest Lab.
BORONATED GRAPHITE IRRADIATION STUDIES SUMMARY REPORT OF THERMAL-NEUTRON-SHIELDED EXPERIMENTS CONDUCTED IN THE ETR,
by L. O. Gates and R. Neidner. Oct 65, 16p
Contract AT (45-1)-1830

Descriptors: (*Thermal neutrons, Reactor shielding materials), (*Reactor shielding materials, Test reactors).

CEX-59.7B **Field 18H**
CFSTI Prices: HC$1.00 MF$0.75
Edgerton, Germeshausen and Grier, Inc., Las Vegas, Nev.
EXPERIMENTAL RADIATION MEASUREMENTS IN CONVENTIONAL STRUCTURES. PART III. THE ATTENUATION OF AIR-SCATTERED RADIATION IN A BASEMENT,
by Z. G. Burson. Apr 65, 78p
Contract AT (29-1)-1183

Descriptors: (*Radioactive fallout, Shelters), (*Structures, Radioactive fallout).

CONF-650512 **Field 18A, 18D, 20M, 20I**
CFSTI Prices: HC$6.00 MF$1.25
Lawrence Radiation Lab., Univ. of California, Livermore.
PROCEEDINGS OF THE 1965 SYMPOSIUM ON ENGINEERING PROBLEMS OF CONTROLLED THERMONUCLEAR RESEARCH, MAY 4-7, 1965.
1965, 247p
Contract W-7405-eng-48

Descriptors: (*Thermonuclear reactions, Nuclear engineering), (*Nuclear engineering, Thermonuclear reactions).

CONF-650620 **Field 18I, 18L, 11F**
CFSTI Prices: HC$3.00 MF$1.50
Chicago Operations Office (AEC), Ill.
PROCEEDINGS OF SODIUM COMPONENTS DEVELOPMENT PROGRAM. INFORMATION MEETING, CHICAGO, ILLINOIS, JUNE 16-17, 1965.
1965, 292p

Descriptors: (*Sodium graphite reactors, Nuclear engineering), (*Reactor materials, Sodium graphite reactors).

CONF-650904-4 **Field 18J, 11F**
CFSTI Prices: HC$1.00 MF$0.50
Dupont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
EFFECT OF MICROSTRUCTURE ON CAVITATIONAL SWELLING OF DILUTE URANIUM ALLOYS,
by W. R. McDonell and C. L. Angerman. 7 Jul 65, 17p
Contract AT (07-2)-1

Descriptors: (*Uranium alloys, Microstructure), (*Reactor fuel elements, Uranium alloys).

CONF-765 **Field 18H, 6R, 18C**
CFSTI Prices: HC$6.50 MF$3.75
Division of Biology and Medicine (AEC), Washington, D. C.
RADIOACTIVE FALLOUT FROM NUCLEAR WEAPONS TESTS,
by Alfred W. Klemcat, Jr. Nov 65, 965p
Proceedings of the Second Conference, Germantown, Maryland, November 3-6, 1964. AEC Symposium series no. 5.

Descriptors: (*Nuclear weapons, Radioactive fallout), (*Radioactive fallout, Nuclear weapons).

DP-990 **Field 18G, 13D, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Savannah River Lab.
LEAKS IN RADIOACTIVE-WASTE TANKS,
by R. M. Girdler. Dec 65, 30p
Contract AT (07-2)-1

Descriptors: (*Radioactive waste, Storage tanks), (*Storage tanks, Radioactive waste).

DP-1000 **Field 18B**
CFSTI Prices: HC$1.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
PRODUCTION OF TRANSPLUTONIUM ELEMENTS AT SAVANNAH RIVER,
by W. P. Overbeck, C. H. Ice and G. Dessauer. Nov 65, 16p CONF-651101-42
Contract AT (07-2)-1
Prepared for presentation at Conference on Remote Systems Technology (1350), Washington, D. C.

Descriptors: (*Plutonium, Isotope availability), (*Curium, Production).

Identifiers: Transplutonium.

DP-1002 **Field 18I, 18L**
CFSTI Prices: HC$2.00 MF$0.50
Du Pont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
FUEL SPACER DEVELOPMENT,
by George W. Richardson. Nov 65, 28p
Contract AT (07-2)-1

Descriptors: (*Power reactors, Reactor fuel elements), (*Reactor fuel elements, Power reactors).

DP-988 **Field 18I, 18M**
CFSTI Prices: HC$2.00 MF$0.50
DuPont de Nemours (E. I.) and Co., Aiken, S. C. Savannah River Lab.
CONTROL OF THE DISSOLVED GASES IN THE MODERATOR OF THE HEAVY WATER COMPONENTS TEST REACTOR,
by L. M. Arhett and H. P. Olson. Nov 65, 31p
Contract AT (07-1)-1

Descriptors: (*Test reactors, Heavy water), (*Reactor moderators, Helium).

EURAEC-1162 **Field 18L**
CFSTI Prices: HC$3.00 MF$0.75
Technische Hogeschool, Eindhoven (Netherlands).
HEAT TRANSFER AND MIXING STUDIES IN A P.W.R.-REACTOR-LOOP.
Quarterly progress rept. no. 1, 1 Jan 64-1 Apr 64. Jun 64, 65p WW015-R67
Contract 11-63-9 TEEN
Proj. N-294

Descriptors: (*Pressurized water reactors, Heat transfer), (*Heat transfer, Pressurized water reactors).

IDO-14658 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
ICPP PROCESSING OF VBWR STAINLESS STEEL FUEL.
Rept. for 14 Apr-2 Jun 65,
by R. W. Legan, N. Kormanik, and B. R. Wheeler. Dec 65, 34p
Contract AT (10-1)-205

Descriptors: (*Reactor fuel elements, Stainless steel), (*Boiling water reactors, Reactor fuel elements).

IDO-17076 **Field 18N**
CFSTI Prices: HC$5.00 MF$1.00
Phillips Petroleum Co. Idaho Falls, Idaho. Atomic Energy Div.
SAFETY ANALYSIS REPORT SNAPTRAN 2/10A-1 AND-2 SAFETY TESTS,
by W. J. Neal. Oct 65, 159p
Contract AT (10-1)-205

Descriptors: (*Auxiliary power plants, Reactor safety systems), (*Radiation hazards, Auxiliary power plants).

LA-3403 **Field 18C**
CFSTI Prices: HC$3.00 MF$0.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
THERMAL NEUTRON SPECTRA FROM AN UNDERGROUND NUCLEAR EXPLOSION WITH SPECIAL CONSIDERATION OF SPECTRAL MODIFICATION DUE TO BOMB DEBRIS MOTION,
by Henry A. Sandmeier and Gordon E. Hansen. Aug 65, 46p
Contract W-7405-eng-36

Descriptors: (*Nuclear explosions, Thermal neutrons), (*Thermal neutrons, Underground explosions).

LF-28 **Field 18G, 6R**
CFSTI Prices: HC$3.50 MF$1.50
Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
SELECTIVE SUMMARY OF STUDIES ON THE FISSION PRODUCT INHALATION PROGRAM.
Technical progress rept., July 64-Jun 65,
by R. G. Thomas. Sep 65, 283p
Contract AT (29-2)-1013

Descriptors: (*Fission products, Respiration), (*Respiration system, Fission products).

MND-P-3006 **Field 18N, 18J**
CFSTI Prices: HC$4.00 MF$0.75
Martin Co., Baltimore, Md. Nuclear Div.

RADIOISOTOPE-FUELED AUXILIARY POWER UNIT.
Quarterly progress rept. no. 9, 1 Jan - 31 Mar 59. Mar 59, 106p
Contract AT (30-3)-217

Descriptors: (*Auxiliary power plants, Reactor fuels), (*Reactor fuels, Radioactive isotopes).

MND-P-3007 **Field 18N, 18J**
CFSTI Prices: HC$5.00 MF$1.00
Martin Co., Baltimore, Md. Nuclear Div.
RADIOISOTOPE-FUELED AUXILIARY POWER UNIT.
Quarterly progress rept no. 10, Apr - Jun 59. Jun 59, 163p
Contract AT (30-3)-217

Descriptors: (*Auxiliary power plants, Reactor fuels), (*Reactor fuels, Radioactive isotopes).

N66-10648 **Field 18N**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.
DEVELOPMENT OF DATA UNFOLDING TECHNIQUES FOR CONTOURED SEMICONDUCTOR NEUTRON SPECTROMETER.
Final rept.,
by J. A. Shannon. 1 Jul 65, 73p
Contract NAS8-11631
NASA CR-67629

Descriptors: (*Nuclear radiation spectrometers, Semiconductors), (*Semiconductors, Nuclear radiation spectrometers).

N66-10675 **Field 18J**
CFSTI Prices: HC$1.00 MF$0.50
Atomics International, Canoga Park, Calif.
TUNGSTEN RESONANCE INTEGRALS AND DOPPLER COEFFICIENTS.
Quarterly progress rept. no. 1, Jul-Sep 65,
by S. G. Carpenter, J. M. Otter, R. K. Paschall, andH. N. Royden. 29 Oct 65, 22p A1-65-225
Contract NAS3-7982
NASA CR-54769

Descriptors: (*Tungsten, Resonance), Doppler effect, Uranium compounds, Oxides.

N66-11627 **Field 18L**
CFSTI Prices: HC$3.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
NUCLEAR ROCKET SIMULATOR TESTS, FLOW INITIATION WITH NO TURBINE GAS TANK PRESSURE, 35 PSIA RUN 1,
by T. J. Biesiadny, R. J. Coltrin, J. N. B. Livingood, A. G. Powers, and R. A. Rudey. 1964, 57p
NASA-TM-X-52044

Descriptors: (*Nuclear reactors, Simulation), Liquefied gases, Hydrogen, Data, Instrumentation.

N66-11628 **Field 18L**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
NUCLEAR ROCKET SIMULATOR TESTS FLOW INITIATION WITH TURBINE ACCELERATED TANK PRESSURE 50 PSIA, RUN 11,
by R. E. Coltrin, T. C. Litzler, J. G. Pierce, D. J. Robinson, and D. M. Straight. 1964, 76p
NASA-TM-X-52066

Descriptors: (*Nuclear reactors, Simulation), Liquefied gases, Hydrogen.

N66-12928 **Field 18B**
CFSTI Prices: HC$6.00 MF$1.50
Cook Electric Co., Morton Grove, Ill. Tech-Center Div.
RADIOISOTOPE HEAT SOURCE EVALUATION PROGRAM.
Final rept., 15 May-13 Dec 64.
1964, 246p
Contract NAS5-3849
NASA CR-68182

Descriptors: (*Radioactive isotopes, Bibliographies), (*Bibliographies, Radioactive isotopes), Energy.

NAA-SR-11528 **Field 18M**
CFSTI Prices: HC$2.00 MF$0.50
Atomics International, Canoga Park, Calif.
CAPABILITIES OF THE 1 Mw SHIELD TEST AND IRRADIATION REACTOR,
by K. G. Golliher and K. G. Randen. 10 Nov 65, 21p
Contract AT (11-1)-GEN-8

Descriptors: (*Radiation damage, Test facilities), (*Nuclear reactors, Shielding).

NAA-SR-11650 **Field 18I, 18J, 18K, 18L**
CFSTI Prices: HC$6.00 MF$1.25
Atomics International, Canoga Park, Calif.
QUARTERLY TECHNICAL PROGRESS REPORT, AEC UNCLASSIFIED PROGRAMS, JULY-SEPTEMBER 1965.
22 Dec 65, 206p
Contract AT (11-1)-GEN-8

Descriptors: (*Fast reactors, Design), (*Reactor materials, Experimental data), Reactor operation, Reactor system components.

NAA-SR-9339 **Field 18I**
CFSTI Prices: HC$3.00 MF$1.25
Atomics International, Canoga Park, Calif.
AEC UNCLASSIFIED PROGRAMS.
Quarterly technical progress rept., Oct-Dec 63. 15 Nov 65, 248p
Contract AT (11-1)-GEN-8

Descriptors: (*Nuclear reactors, Nuclear engineer ing), (*Nuclear engineering, Reactor operation).

NYO-2415-12 **Field 18H**
CFSTI Prices: HC$2.00 MF$0.50
Isotopes, Inc., Westwood, N. J.
STUDIES OF NUCLEAR DEBRIS IN PRECIPITATION,
by James P. Friend. 30 Nov 64, 44p
Contract AT (30--1)-2415

Descriptors: (*Radioactive fallout, Atmospheric precipitation), (*Climatology, Fission products).

ORNL-P-1278 **Field 18L, 14B**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
ECONOMIC ASPECTS OF NUCLEAR DESALINATION.
by C. C. Burwell. 3 May 65, 18p CONF-650532-1
Contract W-7405-eng-26
Presented Institute on Nuclear Materials Management Meeting, Cincinnati.

Descriptors: (*Sea water, Desalination), (*Nuclear power plants, Costs).

ORNL-P-1397 **Field 18K**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
ATOMIC TRANSPORT PROBLEMS OF INTEREST IN NUCLEAR SYSTEMS,
by Ted S. Lundy and Fitz R. Winslow. 1965, 28p CONF-650704-2, SM-66/59
Contract W-7405-eng-26
To be presented at the IAEA Symposium on Thermodynamics, Vienna, Jul 22-27, 1965.

Descriptors: (*Diffusion, Nuclear engineering), (*Nuclear engineering, Transport properties).

ORNL-3878 **Field 18J, 18H, 11F, 18F**
CFSTI Prices: HC$3.00 MF$0.75
Oak Ridge National Lab., Tenn.
RADIATION METALLURGY SECTION, SOLID STATE DIVISION PROGRESS REPORT FOR PERIOD ENDING AUGUST 1965.
Jan 66, 84p
Contract W-7405-eng-26

Descriptors: (*Radiation damage, Metallurgy), (*Metallurgy, Radiation damage).

ORNL-3898 **Field 18N, 11F**
CFSTI Prices: HC$6.00 MF$1.25
Oak Ridge National Lab., Tenn.
SNAP-8 CORROSION PROGRAM SUMMARY REPORT,
by H. W. Savage, E. L. Compere, W. R. Huntley and A. Taboada. Dec 65, 207p
Contract W-7405-eng-26

Descriptors: (*Nuclear power plants, Corrosion), (*Corrosion, Liquid metal coolants), Reactor materials.

Patent 3,224,944 **Field 18J**
CERAMIC-MATRIX-TYPE FUEL ELEMENT WITH GRAPHITE FABRIC AFFIXED TO EXTERIOR SURFACE.
Patent assigned to AEC,
by Richard F. Turner and Ernest O. Winkler. 21 Dec 65
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel elements, Design), (*Graphite, Reactor fuel elements), (*Gas-cooled reactors, Reactor fuel elements), Heat-transfer, Reactor fuels, Ceramic materials, Surfaces, Reactor coolants, Turbulence, Patents.

It is the object of the invention to provide improved fuel elements for high-temperature gas-cooler nuclear reactors. The fuel elements have improved heat-transfer characteristics, do not contaminate the coolant stream, are simple in construction, and are inexpensively manufactured. Fuel particles are positioned within a ceramic matrix and an outer surface of the fuel body is in direct contact with the coolant. A thin fabric is affixed to the outer surface of the fuel body. Its surface creates turbulence and improves heat transfer.

PB-169 225 **Field 18K, 20M, 12A**
CFSTI Prices: HC$4.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
RESOLUTION DE L'EQUATION DE DIFFUSION (DEUX DIMENSIONS, PLUSIEURS REGIONS, CONTOURS QUELCONQUES) (Solution of the Diffusion Equation (2 Dimensions, Several Media, Arbitrary Boundary)).
Master's thesis in French,
by Nguyen Luong Than. Nov 65, 121p CEA-R-2867
Text in French; Attached Summary in English.

Descriptors: (*Diffusion, Partial differential equations), Numerical analysis, Neutron trans port theory, Heat transfer, Mass transfer, France.

Quite often practical problems involve relatively complicated geometrical shapes and several very different media. The discretization technique used here (variable mesh spacings) has the following advantages: it enables one to approximate curved contours more easily, distribute the mesh points more economically and smooth out discontinuities due to two very different media (danger of poor convergence). The method of programming by subroutines mades available to engineers and scientists who are not well acquainted with numerical analysis a simple and foolproof iterative method: it suffices to pass by all the mesh points and to call the corresponding subroutine each time. (Author)

PB-169 226 **Field 18K**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
MOBILITE DES IONS Rb (+) ET Cs (+) DANS LES GAZ A HAUTE PRESSION (Mobility of Rb (+) and Cs (+) Ions in Gases at High Pressures),
by Eugene Bacconnet. Nov 65, 74p CEA-R-2861
Text in French; Attached Summary in English.

Descriptors: (*Ions, Mobility), (*Cesium, Mobility), (*Rubidium, Mobility), Reactor fuel cladding, Fission product poisoning, Gases, Transport properties, High-pressure research, France.

A theoretical study and mobility measurements were made of Rb (+) and Cs (+) ions moving in gases at high pressures (0.01 to 25 kg/cm-sq). The theoretical study was effected using the results of P. Langevin who considers the ions and molecules as elastic spheres and takes into account the electrical polarization forces. The practical work was carried out using the Rb (+) and Cs (+) ions emitted by a thermal source; for the measurement of their velocity the method using an ionic beam cut by four grids was employed. Since the source does not work in atmospheres containing oxygen (even in the combined state) the tests only involved pure gases: nitrogen, argon, helium at pressures of from 0.01 to 12 kg/cm-sq. The overall results show that the Rb (+) and Cs (+) ionic mobilities are very similar and that for fairly short times spent by the ions in the gas, the measurement results are in agreement with theory. An increase in these times favours a degradation of the ions which always leads to a decrease in the mobility. This effect is most marked in helium. Argon and nitrogen behave identically towards Rb (+) and Cs (+) ions. (Author)

PB-169 227 **Field 18K, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE AERODYNAMIQUE DE L'ECOULEMENT FLUIDE DANS UN CANAL DE REACTEUR CHARGE EN ELEMENTS COMBUSTIBLES ANNULAIRES REFROIDIS INTERIEUREMENT ET EXTERIEUREMENT (Aerodynamic Study of the Fluid Flow in the Channel of a Reactor Filled with Internally and Externally Cooled Fuel Elements),
by Jean-Claude Rousseau. Nov 65, 60p CEA-R-2856
Text in French; Attached Summary in English.

Descriptors: (*Reactor coolants, Fluid flow), (*Fluid flow, Reactor coolants), Reactor fuel elements, France.

A study is made of the problem of the flow-rate and pressure distributions along the length of two volumes, internal and external, bounded by a series of noncontignous annular elements placed along the channel axis. It is observed that the phenomenon can easily be represented by equations. The theoretical expressions observed are particularly simple when the distances between the elements are above a certain minimum value. The experimental work has made it possible to show that the theoretical formulation derived is valid with a very great accuracy. The experimental study has also been carried out in the case of a very small spacing between the elements. It has been possible to show in this case that the hypothesis made for deriving the theoretical expressions was perfectly justified. (Author)

PB-169 228 **Field 18K, 18J**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Chusclan (France). Centre de Production de Plutonium de Marcoule.
LE CO2 DE REFROIDISSEMENT DES REACTEURS G 2/G 3 FUITES, ANALYSE, ACTIVITE (The CO2 Cooling Gas for the Reactors G2/G3 (Leaking, Analysis, Activity)),
by Jose Meiffren and Francis Dupay. Oct 65, 79p CEA-R-2847
Text in French; Attached Summary in English.

Descriptors: (*Reactor coolants, Carbon dioxide), (*Gas-cooled reactors, Carbon dioxide), Gas analysis, Gas leaks, France.

The main objective of this study is to publicise the data obtained during five years operation of the reactor G2 and G3 at Marcoule as far as the cooling gas is concerned, from storage of reserves up to its slow escape into the atmosphere, and including all the stages of its practical use, its chemical examination, its nuclear behaviour and its possible physicochemical transformation. This work can not only yield information about the operations carried out at Marcoule but can also provide useful suggestions for improving the sealing and for decreasing the activity of the pressurized gas circuits in reactors similar to G2/G3. (Author)

PNE-238F **Field 18H, 18C**
CFSTI Prices: HC$2.00 MF$0.50
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
INTERCEPTION AND RETENTION OF RADIOACTIVE FALLOUT BY DESERT SHRUBS IN THE SEDAN FALLOUT FIELD. PROJECT 62.83 OF PROJECT SEDAN,
by William E. Martin. 10 Dec 65, 44p
Contract AT (04-1)-GEN-12

Descriptors: (*Radioactive fallout, Plants (Botany)), (*Nuclear explosions, Radioactive fallout).

Identifiers: Sedan project.

TID-22330 **Field 18L, 7A**
CFSTI Prices: HC$4.00 MF$2.25
Bechtel Corp., San Francisco, Calif.
ENGINEERING AND ECONOMIC FEASIBILITY STUDY FOR A COMBINATION NUCLEAR POWER-DESALTING PLANT. PHASES I AND II.
Dec 65, 509p

Descriptors: (*Sea water, Desalination), (*Nuclear power plants, Distilling plants).

WCAP-3269-34 **Field 18K, 20I**
CFSTI Prices: HC$3.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
THEORETICAL CALCULATIONS OF INELASTIC SCATTERING MATRICES FOR MULTIGROUP REACTOR ANALYSIS.
by C. P. Bhalla. Sep 64, 63p
Contract AT (30-1)-3269

Descriptors: (*Inelastic scattering, Probability), (*Nuclear particles, Inelastic scattering).

19. ORDNANCE

AD-467 449 **Field 19A**
CFSTI Prices: HC$1.00 MF$0.50
Feltman Research Labs., Picatinny Arsenal, Dover, N. J.
FEASIBILITY STUDY FOR THE DEVELOPMENT OF A SMOKE TRACER FOR AN APDS SHOT.
Technical memo.,
by David J. Edelman and Seymour M. Kaye. Jul 65, 25p
Proj. DA-1C523801A296
PA TM-1564

Descriptors: (*Tracers (Ordnance), Smokes), Feasibility studies, Armor piercing ammunition, Fin-stabilized ammunition, Firing tests (Ordnance), Ballistics, Capture tests, Ignition, Titanium com pounds, Chlorides, Nose cones, Nitrophenols, Aerodynamic heating.

A feasibility study of a smoke or vapor stream system to function in the nose cone of a fin-stabilized round was conducted. The conventional base-located system could not be used because (a) the round contained a discarding sabot mechanism, and (b) the vibration, jolt, and dust following the discharge of the large vehicle-mounted gun would cause the gunner to momentarily lose sight of the missile. Hence, a persistent trail observable by daylight was needed. Titanium tetrachloride was tried because, on exposure to air, it forms dense white clouds of titanium hydroxide. However, the corrosive properties of this material made it difficult to package. Since calculations indicated that nose temperatures exceeding 300C would be attained during projectile flight, a new approach using a heat-sensitive chemical nose fuze was formulated. Diazodinitrophenol (DDNP), which ignites after 0.25 second of flight (200C), was pressed into the nose cone tip assembly. A conically shaped red smoke composition was inserted directly behind the DDNP. Two holes drilled near the apex of the cone body allowed the generated smoke to escape. This approach worked satisfactorily in static tests. In ballistic tests, however, the smoke composition was ejected as a puff of red smoke with no streaming. (Author)

N66-12871 **Field 19I, 21I**
CFSTI Prices: HC$2.00 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
A STUDY OF SOLID-PROPELLANT VAPORIZATION AND DIFFUSION PROCESSES.
Final technical rept.,
by J. W. Droege, R. W. King, A. Levy, andJ. S. Mc Nulty. 31 Aug 65, 32p
Contract NAS7-100
NASA CR-68228
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-950813.

Descriptors: (*Propellants, Isocynate plastics), Vaporization, Diffusion, Organic compounds, Additives, Ferrocenes.

20. PHYSICS

AD-294 474 **Field 20I, 20N**
CFSTI Price: HC$1.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
THE INCIDENCE OF FOCUSED MICROWAVES UPON IONIZED DISTRIBUTIONS. PART I. PLANE DISTRIBUTIONS.
Technical rept.,
by F. H. Northover. Dec 62, 24p TR62-209N
Contract DA-04-495-ORD-3567, ARPA Order-347-62
See also AD-294 866.

Descriptors: (*Microwaves, Ionization potentials), (*Ionization potentials, Microwaves), Ionization, Lens antennas, Equations, Ioniza-

tion trails, Dielectric properties, Surfaces, Fluid flow, Optics, Wave transmission, Focusing, Mathematical analysis, Plasma physics.

Identifiers: DEFENDER Project.

The effect of a plane slab of ionization located in the focal plane of a focused lens transmission system is investigated. It is found that if the effective dielectric constant is close to unity (no loss) then the transmission through the slab is the same as if it were illuminated with a uniform plane wave. (Author)

AD-294 866 **Field 20I, 20N**
CFSTI Price: HC$3.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
THE INCIDENCE OF FOCUSED MICROWAVES UPON IONIZED DISTRIBUTIONS. PART II. CYLINDRICAL DISTRIBUTIONS.
Technical rept.,
by F. H. Northover. Dec 62, 52p TR62-2090
Contract DA-04-495-ORD-3567, ARPA Order-347-62
See also AD-294 474.

Descriptors: (*Microwaves, Ionization potentials), (*Ionization potentials, Microwaves), Ionization, Wave transmission, Lens antennas, Focusing, Plasma physics, Equations, Integral equations, Bessel functions, Special functions (Mathematical), Mathematical analysis.

Identifiers: DEFENDER Project.

The effect of a circular cylindrical column of ionization located in the focal plane of a focused lens transmission system is investigated. A rigorous solution is found for any size cylinder. When the cylinder is large, the results reduce to those obtained for a plane slab of ionization. (Author)

AD-432 200 **Field 20J, 12A**
CFSTI Price: HC$3.00
Pittsburgh Univ., Pa.
RESEARCH IN GRAVITATIONAL RADIATION AND SPACE TIME,
by Ezra T. Newman. Feb 64, 73p
Contract AF33 (616)-8288,
Proj. AF-7114,
Task 711401
ARL 64-22

Descriptors: (*Gravity, Field theory), (*Relativity theory, Time), Differential geometry, Groups (Mathematics), Transformations (Mathematics), Rings, Bodies of revolution, Topology, Algebraic topology, Geodesics, Motion, Electromagnetic fields, Vector analysis, Rotation, Spin, Reports.

Contents: Behavior of asymptotically flat empty spaces, by E. T. Newman and T. W. J. Unti, reprint from Journal of Mathematical Physics, 3:891-901, 1962. Empty space metrics containing hypersurface orthogonal geodesic rays, by E. T. Newman and L. A. Tamburino, reprint from Journal of Mathematical Physics, 3:902-907, 1962. Empty-space generalization of the Schwarzschild metric, by E. Newman, L. Tamburino, and T. Unti, reprint from Journal of Mathematical Physics, 4:915-923, 1963. An approach to gravitational radiation by a method of spin coefficients, by E. Newman and R. Penrose, reprint from Journal of Mathematical Physics, 3:566-578, 1962, with errata, vol. 4 (no. 7), July 1963. A class of null flat space coordinate systems, by E. T. Newman and T. W. J. Unti. The equivalence problem in spaces and symmetries, by A. I. Janis.

AD-458 418 **Field 20C**
CFSTI Price: HC$5.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
MAGNETIC FIELD COMPUTATIONS FOR UNIFORMLY MAGNETIZED BODIES WITH ODD SHAPES,
by Vivian O'Brien. Nov 64, 51p TG-630
Contract NOw-62-0604-c

Descriptors: (*Magnetic fields, Mathematical analysis), (*Asymmetric bodies, Magnetic fields), Magnets, Bodies of revolution, Configuration, Equations, Numerical analysis, Polynomials.

The magnetic flux function was used to determine the axisymmetric fields generated by a number of rotationally symmetric uniformly magnetized bodies. In some cases an exact direct solution is possible in coordinates appropriate to the body. In other cases an indirect exact approach yielded various non-spherical bodies. A point-wise approximate method was also considered. (Author)

AD-460 373 **Field 20K, 11F**
CFSTI Price: HC$3.60
Brown Univ., Providence, R. I. Div. of Engineering.
INTEGRAL REPRESENTATION OF CREEP AND RATE SENSITIVITY IN METALS.
Technical rept.,
by E. T. Onat and T. T. Wang. Mar 65, 32p TR-39
Contract Nonr-562 (20),
Proj. NR-064-424

Descriptors: (*Metals, Creep), (*Creep, Metals), Ductility, Creep, Strain (Mechanics), Deformation, Tensile properties, Loading (Mechanics), Solids, Viscoelasticity, Integral function, Polynomials, Taylor's series, Linear systems, Functional analysis, Sensitivity, Stresses.

It is shown that Frechet's integral representation of non-linear memory dependent mechanical behavior may not be convenient for order sensitive solids such as metals subjected to high temperatures or to high rates of strain. Order sensitive functionals may constitute a more convenient tool for the description of the mechanical behavior of such solids. In the latter part of the paper integral representations are constructed for order sensitive functionals.

AD-466 097 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Stevens Inst. of Tech., Hoboken, N. J. Dept. of Physics.
ON THE ANALYSIS OF K AND ETA INTO PI DECAY SPECTRA.
Technical rept.,
by S. Taylor, T. Huetter, E. L. Koller, and P. Stamer. Jun 65, 8p SIT-P160
Contract Nonr-3066 (00)
Supported in part by NSF.

Descriptors: (*K mesons, Meson reactions), Pions, Decay schemes, Nuclear resonance, Nuclear models.

AD-466 176 **Field 20E, 20B**
CFSTI Prices: HC$1.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
STIMULATED BRILLOUIN SCATTERING IN ANISOTROPIC MEDIA AND OBSERVATION OF PHONONS,
by H. Hsu and W. Kavage. 15 Jun 65, 17p
OSURF-1935-4
Contract AF33 (615)-2287

Descriptors: (*Lasers, Phonons), Light, Scattering, Brillouin zones, Anisotropy, Excitation, Polarization, Quartz.

Stimulated Brillouin scattering belongs to the general class of parametric interactions of waves and quasi-particles such as magnons, and plasmons as well as phonons. These interactions are governed by Tien's phase matching equations corresponding to the conservation relationships of energy and momentum. For anisotropic media, the interaction can be classified into three types depending upon the scattering angle between the incident and scattered light. The basic process of stimulated Brillouin scattering in anisotropic media is discussed. It is shown that stimulated phonons at radio frequencies can be excited and propagated at room temperature. The characteristic of these phonons in crystal quartz is discussed. The result of the investigation indicates that there is a tendency for stimulated Brillouin scatterings to be initiated near the boundaries of finite crystals due to the relatively large phonon anharmonicity at the boundary. The phonon anharmonicity appears to be the dominating factor in the nonlinearity responsible for parametric interaction in stimulated Brillouin scattering. (Author)

AD-466 177 **Field 20E, 20B**
CFSTI Prices: HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
PARAMETRIC EXCITATION OF ACOUSTIC WAVES IN STIMULATED BRILLOUIN SCATTERING.
Master's thesis,
by W. T. Kavage, 1 Jun 65, 32p OSURF-1935-5
Contract AF33 (615)-2287

Descriptors: (*Lasers, Sound), (*Light, Mechanical waves), Pumping (Optical), Polarization, Quartz, Ruby, Excitation.

Stimulated Brillouin scattering is a traveling wave parametric interaction between an acoustic wave and light. There are three types of stimulated Brillouin scattering and in this thesis the basic concept of these interactions is discussed. Experimental evidence for the backward traveling acoustic wave case is presented. The existence of a threshold power density for this case is shown. The appearance of 'boundary effects' and the disagreement of experimental results with the existing theories is presented. (Author)

AD-466 611 **Field 20L, 18H**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
BIAS INFLUENCE ON RADIATION-INDUCED TRANSISTOR SURFACE EFFECTS,
by C. F. Ramstedt and H. A. Zagorites. 17 May 65, 33p USNRDL-TR-849
Proj. SR-007-11-01,
Task 0551

Descriptors: (*Transistors, Radiation damage), (*Radiation damage, Surface properties), Germanium alloys, Silicon alloys, Electric currents, Voltage.

Tests were performed to determine the influence of bias on radiation induced surface effects in transistors. Sample groups of the similarly rated type 2N526 germanium and type 2N329A silicon alloy junction transistors were irradiated (Co (60) gamma exposure of 57,800 r) under three conditions of bias application: (1) Collector-base voltage and emitter current on continuously, (2) Collector-base voltage and emitter current applied intermittently and (3) Collector-base voltage on continuously with emitter current applied intermittently. Biasing variations (1) and (3) are two conditions of continuously-on bias while variation (2) represents a 'no bias' condition in which the progression of radiation effects were measured. The transistor characteristics I (CBO), beta and h were measured before and throughout the irradiation. Radiation induced surface effects were clearly enhanced by the continuous presence of collector-base voltage in the Ge 2N526. While no clear correlation between voltage and effects was found in the Si 2N329A, it is probable that exposures at higher levels will show a bias influence. No significant influence of emitter current was found. (Author)

AD-466 666 **Field 20G**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic Div., General Dynamics Corp., San Diego, Calif.
ACCELERATOR PULSED FAST ASSEMBLY.
Final rept., 1 Oct 63-31 Dec 64.
19 Feb 65, 65p GA-6218
Contract DA-49-146-XZ-171
DASA 1629

Descriptors: (*Neutron beams, Linear accelerators), (*Linear accelerators, Neutron beams), (*Fast reactors, Linear accelerators), Electron beams, Reactor cores, Prompt neutrons, Subcritical assemblies, Electron bombardment.

AD-466 782 **Field 20F, 14B**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Schenectady, N. Y. Advanced Technology Labs.
A TIME-OF-FLIGHT ELECTRON VELOCITY SPECTROMETER FOR LOW ENERGY COLLISION MEASUREMENTS.
Semi-annual technical rept. Oct 62-1 Jun 65,
by G. C. Baldwin and S. I. Friedman. Jun 65, 86p
Contract Nonr-3942 (00)

Descriptors: (*Spectrum analyzers, Design), Electrons, Velocity, Gases, Elastic scattering, Helium.

A time-of-flight velocity selector is described that is designed for measurement of the total collision cross section of electrons in gases in the energy region below one volt, where beam-deflection methods are difficult and few data exist. The spectrometer essentially comprises a photoemitter, illuminated by a spark gap, separated by a shielded 0.45-meter drift path from a detector, consisting of an accelerating field and an electron multiplier, with electronic equipment for time and amplitude analysis and auxiliary apparatus for introduction of gases at known concentration. Design considerations are presented, followed by a description of the major components. Data illustrative of performance are given, together with initial transmission measurements in helium at electron energies down to 125 millivolts. Applications and extensions of the technique are discussed. (Author)

AD-467 443 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Utah Research and Development Co., Salt Lake City.
THEORETICAL AND EXPERIMENTAL STUDY OF LOW-VELOCITY PENETRATION PHENOMENA.
Semiannual rept., Phases 3, 4, and 5.
Nov 64, 49p
Contract DA-19-129-AMC-150 (X), ARPA Order-267

Descriptors: (*Deformation, Solids), (*Penetration, Mechanics), Wire, Rods, Impact shock, Mathematical models.

The tensor formulation of the stress-strain relationships involved in finite time-dependent deformation of a solid has been changed from that previously reported. The new mathematical model is described along with a discussion of the applicable mathematics. The computer code developed to calculate the flow field in impact has been modified to eliminate propagated error in the time dimension. A system for high speed photographic analysis of deformation of wires and rods is described. Data from rod-to-rod impact are analyzed to determine the energies involved in metal deformation. Average energy per unit deformation is found to decrease with increasing impact velocity. (Author)

AD-467 786 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Alabama Univ., Huntsville, Research Inst.
INVISCID HIGH TEMPERATURE HYPERSONIC FLOW OF AIR PAST POINTED BODIES OF REVOLUTION.
Quarterly interim technical rept., 30 Jun-30 Sep 64,
by Jurgen Thoenes and Rudolf Hermann. Oct 64, 44p
Contract DA-01-009-AMC-166 (Z)

Descriptors: (*Bodies of revolution, Hypersonic flow), (*Hypersonic flow, Bodies of revolution), Air, Shock waves, Wake, Enthalpy, High-temperature research.

The gas model and the thermodynamic equations were thoroughly checked and rederived. The equations of motion governing the flow past any object were derived with respect to an orthogonal curvilinear coordinate system, suitable for a large group of bodies of rather general shape. Boundary conditions (shock relations) were obtained for chemically frozen and for equilibrium flow. As for the solution of the system of governing equations, Dorodnitsyn's method of integral relations (direct method) was studied in general. Specializing the general method, all the necessary equations for the first approximation were derived. (Author)

AD-467 882 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Carnegie Inst. of Tech., Pittsburgh, Pa. Dept. of Physics.
SPECTROSCOPIC FACTORS FROM DEUTERON STRIPPING REACTIONS LEADING TO GROUND AND FIRST EXCITED STATES OF EVEN SPHERICAL NUCLEI.
Technical rept.,
by R. Sorensen, E. K. Lin, and B. L. Cohen. Jul 65, 26p TR-17
Contract Nonr-760 (15),
Projs. NR-024-439, NR-012-202
Prepared in cooperation with Pittsburgh Univ., Pa.

Descriptors: (*Deuteron bombardment, Nuclear reactions), (*Nuclear structure, Wave functions), Nuclear energy levels, Ground state, Excitation, Nuclei, Nuclear models, Deuteron capture.

Identifiers: Stripping.

Deuteron stripping reactions on odd-neutron targets from Cr to Sm leading to the ground and first excited states of the even system are analyzed with DWBA calculations. Theoretical spectroscopic factors are computed for these reactions using wave functions derived from the pairing plus P (2) model. One such factor is calculated and measured for the ground state transition, while for the first excited state the analysis is in terms of several spectroscopic factors corresponding to several 'l' values for the transferred neutron. For the ground state, the agreement between experiment and theory is excellent. For the excited state the agreement is not so good, but most of the spectroscopic factors are in agreement to about a factor of two. (Author)

ANL-6954 **Field 20I**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
LIQUID MHD POWER CYCLE STUDIES,
by Michael Petrick and Kung-You Lee. Jun 65, 91p
Contract W-31-109-eng-38

Descriptors: (*Magnetohydrodynamics, Generators), (*Liquid metals, Magnetohydrodynamics).

ANL-7032 **Field 20M, 13A**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
AN INVESTIGATION OF INSTABILITIES ENCOUNTERED DURING HEAT TRANSFER TO A SUPERCRITICAL FLUID,
by Archie Cornelius, Jr. Apr 65, 93p
Contract W-31-109-eng-38

Descriptors: (*Heat transfer, Fluid flow), (*Thermo dynamics, Fluids).

ANL-7041 **Field 20M, 18I**
CFSTI Prices: HC$5.00 MF$1.00
Argonne National Lab., Ill.
FREQUENCY-RESPONSE ANALYSIS OF STEAM VOIDS TO SINUSOIDAL POWER MODULATION IN A THIN-WALLED BOILING WATER COOLANT CHANNEL.
Doctoral thesis,
by Carl C. St. Pierre. May 65, 148p
Contract W-31-109-eng-38

Descriptors: (*Boiling water reactors, Stability), (*Reactor operations, Boiling water reactors).

ANL-7063 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
SOME TOPICS IN STATISTICAL MECHANICS. (MOLECULAR DISTRIBUTION FUNCTIONS, CLUSTER EXPANSIONS, ETC.) A SERIES OF LECTURES,
by B. R. A. Nijboer. Jun 65, 66p
Contract W-31-109-eng-39

Descriptors: (*Solid state physics, Statistical mechanics), (*Statistical mechanics, Solid state physics).

ANL-7065 **Field 20J**
CFSTI Prices: HC$1.00 MF$0.50
Argonne National Lab., Ill.
NOTES ON AXIOMS FOR QUANTUM MECHANICS,
by M. D. Maclaren. Jul 65, 21p
Contract W-31-109-eng-38

Descriptors: (*Quantum mechanics, Algebra).

ANL-7076 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
PICTORIAL STUDIES OF MOLECULES. I. MOLECULAR ORBITAL DENSITY COMPARISONS OF H 2, Li 2, B 2, C 2, N 2, O 2, AND F 2,
by Arnold C. Wahl. Jul 65, 58p
Contract W-31-109-eng-38

Descriptors: (*Molecular orbitals, Diatomic molecules), (*Diatomic molecules, Molecular orbitals).

ANL-7089 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Argonne National Lab., Ill. Associated Midwest Universities, Lemont, Ill.
STRESS ANALYSIS OF REINFORCED CIRCULAR AND RECTANGULAR FLAT PLATES,
by James L. S. Chen, Chi-Shing Lai, and Donald A.Moan. Aug 65, 28p
Contract W-31-109-eng-38

Descriptors: (*Pressure vessels, Metal plates), (*Metal plates, Stresses).

CONF-650524-2 **Field 20H, 9B**
CFSTI Prices: HC$1.00 MF$0.50
Knolls Atomic Power Lab., Schenectady, N. Y.
EVALUATION OF NEUTRON CROSS SECTIONS AT THE KNOLLS ATOMIC POWER LABORATORY.
by N. C. Francis and C. R. Lubits. 19 Apr 65, 3p

Contract W-31-109-eng-52
Presented at the European Nuclear Energy Agency and Atomic Energy Commission Seminar, Upton, N. Y.

Descriptors: (*Neutron cross sections, Nuclear physics laboratories), (*Programming (Computers), Neutron cross sections).

CU-2660-16 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
Columbia Univ., New York. Dept. of Chemical Engineering.
HIGH-TEMPERATURE THERMAL PROPERTIES OF GASES AND VAPORS. PROGRESS REPORT, 1964/65,
by Charles F. Bonilla. Mar 65, 25p
Contract AT (30-1)-2660

Descriptors: (*Gases, Thermal properties), (*Vapors, High-temperature research).

GA-6152 **Field 20H, 5K**
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
USE OF NEUTRON ACTIVATION ANALYSIS IN SCIENTIFIC CRIME DETECTION. 12-MONTH SUMMARY REPORT FOR THE PERIOD NOVEMBER 1, 1963-OCTOBER 31, 1964,
by D. E. Bryan and V. P. Guinn. 15 Feb 65, 59p
Contract AT (04-3)-167

Descriptors: (*Criminology, Neutron activation), (*Neutron activation, Criminology), Radioactivation analysis.

IMP-AEC-34 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Institute for Molecular Physics, Univ. of Maryland, College Park.
TRANSPORT PROPERTIES OF GASEOUS HE 3 AND HE 4,
by L. Monchick, E. A. Mason, and R. J. Munn. 1 Mar 65, 29p IMP-AEC-34
Contract AT (40-1)-2058

Descriptors: (*Helium, Transport properties), (*Gases, Helium).

LA-3372 **Field 20G**
CFSTI Prices: HC$7.00 MF$1.50
Los Alamos Scientific Lab., Univ. of California, N. Mex.
ANALYSIS OF A PROTON LINEAR ACCELERATOR RF SYSTEM AND APPLICATION TO RF PHASE CONTROL,
by Robert A. Jameson. Jun 65, 293p
Contract W-7405-eng-36

Descriptors: (*Linear accelerators, Protons), (*Radiofrequency, Phase control devices).

LA-3380 **Field 20H**
CFSTI Prices: HC$4.00 MF$1.00
Los Alamos Scientific Lab., Univ. of California, N. Mex.
A TABLE OF BINDING ENERGIES AND PARTICLE SEPARATION ENERGIES FROM A MASS LAW,
by Philip A. Seeger. 1 Sep 65, 106p
Contract W-7405-eng-36

Descriptors: (*Nuclear binding energy, Mass-energy relation), (*Nuclear particles, Nuclear energy).

LA-3415 **Field 20H**
CFSTI Prices: HC$3.00 MF$0.75
Los Alamos Scientific Lab., Univ. of California, N. Mex.
COMPUTATION OF FAST NEUTRON PENETRATION IN AIR BY THE SN-METHOD WITH SPECIAL EMPHASIS ON THE USE OF MULTI-TABLE-MULTI- GROUP CROSS SECTION SETS,
by H. A. Sandmeier, G. E. Hansen, and R. B. Lazarus. Aug 65, 66p
Contract W-7405-eng-36

Descriptors: (*Fast neutrons, Neutron transport theory), (*Neutron flux, Numerical analysis).

MLM-1288 **Field 20C**
CFSTI Prices: HC$1.00 MF$0.50
Mound Lab., Miamisburg, Ohio.
A GENERAL METHOD OF DETERMINING THE TOTAL TIME INTEGRAL OF TRANSIENTS IN LINEAR SYSTEMS,
by K. C. Jordan. 1 Feb 65, 17p
Contract AT (33-1)-GEN-53

Descriptors: (*Linear systems, Transients), (*Transients, Integral transforms).

N66-10335 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ATTENUATION OF SINUSOIDAL PERTURBATIONS SUPERIMPOSED ON LAMINAR FLOW OF A LIQUID IN A LONG LINE,
by R. J. Blade, R. G. Dorsch, and C. M. Holland. Nov 65, 24p NASA-TN-D-3099

Descriptors: (*Laminar flow, Liquids).

N66-10425 **Field 20H**
CFSTI Prices: HC$7.00 MF$2.00
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PROCEEDINGS OF THE MAGNETICS WORKSHOP.
Technical memo., 30 Mar-1 Apr 65,
by J. G. Bastow. 15 Sep 65, 412p JPL-TM-33-216
Contract NAS7-100
NASA CR-67605

Descriptors: (*Spacecraft, Magnetic fields).

N66-10619 **Field 20M**
CFSTI Prices: HC$1.00 MF$0.50
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
ROCKET BASE FLOW FIELD STUDIES USING AN ELECTRON BEAM PROBE.
Quarterly progress rept. no. 1, 25 Jun-25 Sep 65. 1965, 13p
Contract NSR-33-009-030
NASA CR-67880

Descriptors: (*Electron beams, Temperature).

N66-10628 **Field 20M**
CFSTI Prices: HC$3.00 MF$0.75
Northrop Space Labs., Hawthorne, Calif.
RESEARCH AND DEVELOPMENT STUDY ON THERMAL CONTROL BY USE OF FUSIBLE MATERIALS.
Interim rept., Mar 64-Jan 65,
by E. W. Bentilla and A. P. Shlosinger. Feb 65, 92p NSL-65-16
Contract NAS8-11163
NASA CR-67695

Descriptors: (*Spacecraft, Temperature control).

N66-10647 **Field 20L**
CFSTI Prices: HC$1.00 MF$0.50
TRW Space Technology Labs., Redondo Beach, Calif.
CARRIER LIFETIME MEASUREMENTS AND RECOMBINATION CHARACTERISTICS IN SILICON AND STUDIES PHENOMENA ASSOCIATED WITH RADIATION INDUCED DEFECT LEVELS,
by R. G. Downing. 20 Aug 65, 2p
Contract NAS5-3805
NASA CR-67631

Descriptors: (*Silicon, Radiation damage), (*Recombination reactions, Silicone).

N66-10651 **Field 20A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
EXPERIMENTAL NOISE STUDIES OF INLET-GUIDE-VANE-ROTOR-STATOR INTERACTIONS FOR A SINGLE-STAGE AXIAL-FLOW COMPRESSOR,
by W. L. Copeland and J. L. Crigler. 1965, 16p
NASA-TM-X-56903

Descriptors: (*Axial-flow compressors, Noise), (*Inlet guide vanes, Noise).

N66-10670 **Field 20D**
CFSTI Prices: HC$2.00 MF$0.50
Westinghouse Electric Corp., Pittsburgh, Pa. Research Labs.
ELECTRON COLLISION CROSS SECTIONS IN METAL VAPORS.
Semiannual rept.,
by N. S. Emmerich and J. F. Nolan. 19 Aug 65, 34p Rept. no. -65-1E5-MHDIN-R1
Contract NAS3-7100
NASA CR-54474

Descriptors: (*Vapors, Nuclear cross sections), (*Metals, Nuclear cross sections), Cesium, Electrons, Helium.

Identifiers: Townsend discharge.

N66-10672 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
MAGNETOSPHERIC PHENOMENA,
by J. G. Roederer. Sep 65, 25p NASA-TM-X-55300

Descriptors: (*Upper atmosphere, Physics).

Identifiers: Magnetosphere.

N66-10674 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
THEORY OF LOW-ENERGY POSITRON-HELIUM SCATTERING,
by R. J. Drachman. Nov 65, 21p NASA-TM-X-55301, X-641-65-460

Descriptors: (*Positrons, Helium), (*Helium, Nuclear scattering).

N66-10676 **Field 20K**
CFSTI Prices: HC$4.00 MF$0.75
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
COMPRESSION TESTS ON INTEGRALLY STIFFENED CYLINDERS,
by L. Katz. 6 Aug 65, 111p NASA-TM-X-53315

Descriptors: (*Stiffened cylinders, Compressive properties).

N66-10681 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
RAND Corp., Santa Monica, Calif.
ON THE FLOW OF A MAGNETIZED SOLAR WIND AROUND THE MOON,
by J. R. Jokipii. Sep 65, 13p RM-4714-NASA
Contract NASR-21
NASA CR-67820

Descriptors: (*Planetary atmospheres, Magnetic fields), (*Lunar environment, Wind).

N66-10684 Field 20H
CFSTI Prices: HC$5.00 MF$1.00
Northrop Space Labs., Hawthorne, Calif.
ENGINEERING STUDY TO DETERMINE FEASIBLE METHODS OF SIMULATING PLANETARY ALBEDO AND RADIATION EFFECTS UPON THE THERMAL BALANCE OF SPACECRAFT.
Final rept.,
by C. Cafaro, M. K. Fairchild, H. J. Harris, A. P. Shlosinger, and V. M. Urban. Jan 65, 168p
NSL-65-5
Contract NAS7-100
NASA CR-67813
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Rept. no. JPL-950829.

Descriptors: (*Spacecraft, Radiation damage), (*Albedo (Astronomy), Simulation), Mars, Venus.

N66-10687 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
A COMPARISON OF TWO EMITTANCE MEASUREMENT TECHNIQUES,
by J. B. Heaney. Sep 65, 20p NASA-TM-X-55294, X-713-65-354

Descriptors: (*Spacecraft, Coatings), (*Coatings, Temperature control).

N66-10772 Field 20M, 20L, 14B
CFSTI Prices: HC$2.00 MF$0.50
National Bureau of Standards, Boulder, Colo.
CRYOGENIC RESEARCH AND DEVELOPMENT TENTH PROGRESS REPORT, PERIOD ENDING JUN. 30, 1963.
30 Jun 63, 37p NBS-7921
NASA CR-67682

Descriptors: (*Cryogenics, Scientific research), Instrumentation, Materials, Liquified gases, Hydrogen.

N66-10775 Field 20L
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Stanford Electronics Labs.
FUNDAMENTAL STUDIES OF THE METALLURGICAL, ELECTRICAL, AND OPTICAL PROPERTIES OF GALLIUM PHOSPHIDE.
Quarterly progress rept. 1 Jul-30 Sep 65.
1965, 43p
Grant NsG-555
NASA CR-67780

Descriptors: (*Gallium compounds, Phosphides), Semiconductors, Physical properties.

Identifiers: Gallium phosphide.

N66-10878 Field 20H, 4B
CFSTI Prices: HC$3.00 MF$0.75
Avco-Everett Research Lab., Everett, Mass.
A LIMIT ON STABLY TRAPPED PARTICLE FLUXES,
by C. F. Kennel and H. E. Petschek. Jul 65, 65p
RR-219
Contracts NAS-837, Nonr-2524 (00)
NASA CR-67725

Descriptors: (*Noise, Particles), Whistlers, Particle trajectories, Ions, Cyclotrons.

N66-10881 Field 20K, 11D
CFSTI Prices: HC$3.00 MF$0.75
Case Inst. of Tech., Cleveland, Ohio. Engineering Design Center.
THE SYNTHESIS OF A LAMINATED PLATE FOR HIGH TEMPERATURE APPLICATION,
by D. E. Kinser and L. A. Schmit, Jr. Jul 64, 86p
EDC-2-64-7
Grant NsG-110-61
NASA CR-67703

Descriptors: (*Laminates, Heat-resistant materials), Thermoelasticity.

N66-10888 Field 20D, 22D
CFSTI Prices: HC$3.00 MF$0.75
Purdue Univ., Lafayette, Ind. School of Aeronautical and Engineering Sciences.
STUDY OF RECIRCULATING GAS FLOW FIELDS IN THE BASE REGION OF SATURN-CLASS VEHICLES.
Quarterly progress rept. 1 May-31 Jul 65,
by R. F. Hoglund. 1965, 85p
Contract NAS8-11485
NASA CR-67707

Descriptors: (*Base flow, Launch vehicles (Aero space)), (*Launch vehicles (Aerospace), Base flow), Nozzle gas flow.

Identifiers: Saturn (Booster).

N66-10937 Field 20K
CFSTI Prices: HC$7.00 MF$1.75
General American Research Div. General Transportation Corp., Niles, Ill.
TRANSPORTATION SHOCK AND VIBRATION, VOLUME 2, APPENDIX D.
Final rept.
Sep 65, 347p MR-1262
Contract NAS8-11451
NASA CR-67940

Descriptors: (*Railroad cars, Shock (Mechanics), (*Transport planes, Shock (Mechanics), (*Cargo vehicles, Shock (Mechanics), Transportation, Vibration.

N66-10957 Field 20N
CFSTI Prices: HC$3.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
THEORETICAL CURVES OF BACKSCATTERING CROSS SECTIONS OF ROUGH SURFACES FOR SEVERAL POLARIZATION STATES USING TWO STATISTICAL MODELS,
by D. E. Barrick. 31 Aug 65, 51p
Grant NsG-213-61
NASA CR-67933

Descriptors: (*Surfaces, Polarization), (*Polarization, Surfaces).

Identifiers: Backscatter.

N66-10959 Field 20J
CFSTI Prices: HC$4.00 MF$0.75
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
RELATIVISTIC INTERMOLECULAR FORCES,
by W. J. Meath. 2 Apr 65, 116p WIS-TC1-75
Grant NsG-275-62
NASA CR-67914

Descriptors: (*Hamiltonian, Magnetic fields), (*Molecular association, Energy), (*Energy, Molecular association).

N66-11139 Field 20H
CFSTI Prices: HC$3.00 MF$0.75
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
THEORETICAL STUDY OF SPACE PLASMAS.
Final rept., 16 Feb 64 - 15 Mar 65,
by D. B. Chang, L. D. Pearlstein, and N. N. Rosenbluth. 1965, 82p GA-6220
Contract NASw-907
NASA CR-67711

Descriptors: (*Van Allen radiation belt, Stability), (*Magnetic moments, Particles), Magnetic resonance, Plasma physics, Magnetohydrodynamics.

N66-11181 Field 20D
CFSTI Prices: HC$5.00 MF$1.00
Iowa State Univ. of Science and Technology. Ames.
FLUID VELOCITY PROFILE DEVELOPMENT FOR TURBULENT FLOW IN SMOOTH ANNULI.
Doctoral thesis,
by T. H. Okiishi. Jul 65, 154p
Grant NsG-62-60
NASA CR-67989
Prepared in cooperation with Iowa Engineering Experiment Station.

Descriptors: (*Fluid flow, Heat transfer), (*Turbulent flow, Heat transfer), Velocity.

Identifiers: Newtonian fluid.

N66-11210 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ON THE DETERMINATION OF SOLAR EUV EMISSION ALTITUDES USING THE EARTH AS AN OCCULTING DISK,
by S. O. Kastner and C. L. Wolff. Jul 65, 25p
NASA-TM-X-55314, X-614-65-289

Descriptors: (*Sun, Ultraviolet radiation), Altitude, Earth, Solar atmosphere.

N66-11222 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.
OBSERVATIONS OF SOLAR RADIO BURSTS AT 26.3 MC/S,
by W. C. Erickson and H. H. Malitson. Aug 65, 35p NASA-TM-X-55327, X-615-65-342
Prepared in cooperation with Maryland Univ., College Park.

Descriptors: (*Solar corona, Brightness).

N66-11224 Field 20H
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
HYDROGEN AND HELIUM IONS,
by S. J. Bauer. Sep 65, 26p NASA-TM-X-55329, X-615-65-361

Descriptors: (*Hydrogen, Mass spectroscopy), (*Helium, Mass spectroscopy), Ions, Spacecraft, Very low frequency.

N66-11225 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
DAMPING OF INTERSTELLAR PLASMA WAVES BY THE COSMIC RAY GAS,
by D. A. Tidman. Aug 65, 21p NASA-TM-X-55330, X-640-65-363
Prepared in cooperation with Maryland Univ., College Park.

Descriptors: (*Magnetohydrodynamics, Damping), Cosmic rays, Interstellar matter.

N66-11226 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
ULTRAVIOLET DEGRADATION STUDY,
by W. T. Bottoms, J. J. Webb and M. A. Lillywhite. Sep 65, 18p NASA-TM-X-55331, X-713-65-365
Contract NAS5-2382

Descriptors: (*Coatings, Ultraviolet radiation), Degradation, Optical properties.

N66-11231 Field 20M
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
RELATIVISTIC CHARGED FLUID FLOW. I. ENTROPY FORCE TENSOR,
by L. A. Schmid. Sep 65, 47p NASA-TM-X-55336, X-641-65-380

Descriptors: (*Fluid flow, Entropy), Heat transfer, Absorption.

N66-11232 Field 20F
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
EFFECTS OF A SIMULATED HIGH ENERGY ELECTRON SPACE ENVIRONMENT ON THE ULTRA- VIOLET TRANSMITTANCE OF OPTICAL MATERIALS BETWEEN 1050 AND 3000 A,
by D. F. Heath and P. A. Sacher. Sep 65, 26p NASA-TM-X-55337, X-622-65-382

Descriptors: (*Wave transmission, Optical materials), (*Optical materials, Space environmental conditions), Electron optics, Ultraviolet radiation.

N66-11237 Field 20I
CFSTI Prices: HC$3.00 MF$0.50
United Aircraft Corp., East Hartford, Conn. Research Labs.
INVESTIGATION OF COLLISION PROBABILITY OF ELECTRONS AND IONS WITH ALKALI METAL ATOMS.
Semiannual rept.,
by R. H. Bullis and W. L. Nighan. 26 Nov 65, 51p UACRL-D-920243-18
Contract NAS3-4171
NASA CR-54790

Descriptors: (*Electrons, Scattering), (*Ions, Scattering), Alkali metals, Probability.

Identifiers: Collision probability.

N66-11241 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
General Dynamics/Astronautics, San Diego, Calif. Convair Div.
ZERO-G REPORT. LH2. FILM BOILING,
by T. W. Ohanlon. 2 Mar 62, 22p GD/A-55D-859-2
NASA CR-54797

Descriptors: (*Hydrogen, Film boiling), (*Film boiling, Hydrogen), Boiling, Liquefied gases, Gravity, Drop testing.

N66-11245 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
General Dynamics/Astronautics, San Diego, Calif.
POST-BUCKLING STRENGTH OF A PRESSURIZED CYLINDER,
by D. J. Peery. 16 Oct 64, 9p GD/A-DDG-64-024A
NASA CR-54802

Descriptors: (*Cylindrical bodies, Buckling (Mechanics)), Pressure.

N66-11246 Field 20L
CFSTI Prices: HC$3.00 MF$0.75
Monsanto Chemical Co., St. Louis, Mo. Central Research Dept.
DEVELOPMENT OF IMPROVED SINGLE CRYSTAL GALLIUM PHOSPHIDE SOLAR CELLS.
Final rept. 15 Aug 64-15 Aug 65,
by A. S. Epstein and W. O. Groves. 15 Aug 65, 94p
Contract NAS3-6014
NASA CR-54760

Descriptors: (*Solar cells, Gallium compounds), Phosphides, Single crystals, Tellurium.

Identifiers: Gallium phosphide.

N66-11749 Field 20J
CFSTI Prices: HC$1.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
IMPROVEMENT OF UNCOUPLED HARTREE-FOCK EXPECTATION VALUES FOR PHYSICAL PROPERTIES,
by S. T. Epstein, D. F. Tuan, and J. O. Hirschfelder. 4 Sep 65, 12p WIS-TCI-121
Grant NsG-275-62
NASA CR-68051

Descriptors: (*Physical properties, Analysis).

Identifiers: Hartree-Fock calculation.

N66-11763 Field 20N
CFSTI Prices: HC$1.00 MF$0.50
Illinois Univ., Urbana. Electrical Engineering Research Lab.
CROSS-CORRELATION FUNCTIONS OF SPHERICAL WAVES PROPAGATING THROUGH A SLAB CONTAINING ANISOTROPIC IRREGULARITIES,
by C. H. Liu. 15 Aug 65, 22p
Grant NsG-24-59
NASA CR-67998

Descriptors: (*Spherical waves (Mathematical), Functions), Anisotropy.

N66-12141 Field 20M
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CRITICAL HEAT FLUX FOR SATURATED POOL BOILING FROM HORIZONTAL AND VERTICAL WIRES IN REDUCED GRAVITY,
by J. R. Howell and R. Siegel. Dec 65, 27p NASA-TN-D-3123

Descriptors: (*Ethenols, Boiling), (*Water, Boiling).

N66-12143 Field 20D
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DATA COMPARISONS AND PHOTOGRAPHIC OBSERVATIONS OF COAXIAL MIXING OF DISSIMILAR GASES AT NEARLY EQUAL STREAM VELOCITIES,
by O. J. Edwards and R. G. Ragsdale. Dec 65, 19p NASA-TN-D-3131

Descriptors: (*Gases, Mixtures), (*Turbulence, Gases).

N66-12144 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CROSS SECTION FOR IMPACT IONIZATION OF ATOMS BY H/IS/ ATOMS NEAR THRESHOLD,
by J. W. Sheldon. Dec 65, 15p NASA-TN-D-3134

Descriptors: (*Hydrogen, Ionization).

N66-12145 Field 20L
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Lewis Research Center, Cleveland, Ohio.
HALL COEFFICIENT OF TANTALUM CARBIDE AS FUNCTION OF CARBON CONTENT,
by R. T. Dolloff and G. J. Santoro. Dec 65, 10p NASA-TN-D-3135

Descriptors: (*Tantalum compounds, Hall effect), (*Carbides, Hall effect).

Identifiers: Tantalum carbide.

N66-12147 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STATISTICAL DISTRIBUTION OF THE BREAKING STRENGTH OF A BUNDLE OF CLASSICAL FIBERS,
by B. M. Rosenbaum. Dec 65, 12p NASA-TN-D-3137

Descriptors: (*Fibers, Load distribution).

N66-12163 Field 20J
CFSTI Prices: HC$2.00 MF$0.50
Radio Corp. of America, Princeton, N. J. Defense Electronic Projects.
ADSORPTION OF CESIUM ON INSULATORS,
by J. D. Levine. Dec 65, 39p
Contract NAS3-4173
NASA CR-349

Descriptors: (*Cesium, Adsorption), (*Adsorption, Cesium).

N66-12190 Field 20D
CFSTI Prices: HC$3.00 MF$0.75
Southwest Research Inst., San Antonio, Tex.
SUBHARMONIC OSCILLATIONS IN AN ARBITRARY AXISYMMETRIC TANK RESULTING FROM AXIAL EXCITATION.
Technical rept. no. 5,
by W. H. Chu. Sep 65, 66p
Contract NAS8-11045
NASA CR-68161

Descriptors: (*Tanks (Containers), Fluid mechanics), (*Oscillation, Tanks (Containers)), Harmonic oscillators, Perturbation theory, Liquids, Geometric forms.

N66-12526 Field 20K
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STRESS-INTENSITY FACTORS FOR THREE-POINT BEND SPECIMENS BY BOUNDARY COLLOCATION,
by B. Gross and J. E. Strawley. Dec 65, 15p
NASA-TN-D-3092

Descriptors: (*Structures, Stresses).

N66-12612 Field 20I, 14B
CFSTI Prices: HC$3.00 MF$0.50
Space Sciences, Inc., Natick, Mass.
THE DEVELOPMENT OF A SOURCE OF VACUUM ULTRAVIOLET AND SOFT X-RADIATION.
Final rept.,
by M. Doctoroff and J. Proud. Jun 64, 54p SSI-FR-91
Contract NAS5-3365
NASA CR-68225

Descriptors: (*Ultraviolet radiation, Sources), (*X-rays, Sources), Vacuum, Helium, Plasma medium, Plasma physics.

N66-12860 Field 20E
CFSTI Prices: HC$3.00 MF$0.75
Arkansas Univ., Little Rock. Graduate Inst. of Tech.
INVESTIGATION OF LASER PROPERTIES RELEVANT TO THE MEASUREMENT OF DIFFERENT PHYSICAL PARAMETERS.
Semiannual status rept., Mar 1-Sep 1, 65,
by M. K. Testerman. 11 Oct 65, 65p
Grant NsG-713
NASA CR-68235

Descriptors: (*Lasers, Performance (Engineering)), Vibration, Surfaces, Frequency, Pressure, Sensitivity.

N66-12873 Field 20B
CFSTI Prices: HC$1.00 MF$0.50
Tennessee Univ., Knoxville. Dept. of Chemical and Metallurgical Engineering.
THE APPLICATION OF DIFFUSE X-RAY-SCATTERING TO THE STUDY OF THE STRUCTURE OF BINARY ALLOYS.
Semiannual progress rept., 1 Mar-31 Aug 65,
by J. E. Spruiell. 1965, 9p
Contract NGR-43-001-018
NASA CR-68233

Descriptors: (*Crystal growth, Single crystals), (*Alloys, Crystal structure), Mechanical properties, Physical properties, X-rays.

N66-12962 Field 20F
CFSTI Prices: HC$3.00 MF$0.50
IIT Research Inst., Chicago, Ill.
INVESTIGATION OF LIGHT SCATTERING IN HIGHLY REFLECTING PIGMENTED COATINGS.
Quarterly rept., 1 Aug-1 Nov 65,
by M. R. Jackson, B. H. Kaye, and G. A. Zerlaut. 9 Nov 65, 58p IITRI-U6003-16
Contract NASR-65/07/
NASA CR-68299

Descriptors: (*Coatings, Light transmission), (*Light, Scattering), (*Pigments, Light transmission), Paints, Monte Carlo method.

N66-12964 Field 20I
CFSTI Prices: HC$3.00 MF$0.50
Stanford Univ., Calif. Inst. for Plasma Research.
ARGON PLASMA TRANSPORT PROPERTIES,
by R. S. De Voto. Feb 65, 59p SU-AA217, SU-DAER-217
Grant NsG-299-63
NASA CR-68297

Descriptors: (*Transport properties, Argon), (*Argon, Transport properties), Plasma physics.

N66-12966 Field 20H
CFSTI Prices: HC$1.00 MF$0.50
ENRICO Fermi Inst. for Nuclear Studies. Chicago Univ., Ill.
PROTONS AND HELIUM NUCLEI WITHIN INTERPLANETARY MAGNETIC REGIONS WHICH COROTATE WITH THE SUN,
by C. Y. Fan, G. Gloeckler, and J. A. Simpson. 1965, 16p EFINS-65-89
Contracts AF 19/628/-2473, NAS5-2990
NASA CR-68314

Descriptors: (*Planetary atmospheres, Magnetic fields), (*Magnetic fields, Protons), Helium, Cosmic rays.

N66-12976 Field 20K
CFSTI Prices: HC$3.00 MF$0.75
Alabama Univ., University. Bureau of Engineering Research.
COMPARISON OF SEVERAL ANALYTICAL SOLUTIONS TO THE SHEAR LAG PROBLEM WITH EXPERIMENTAL DATA.
Progress rept. no. 5,
by D. M. Rigsby. Aug 65, 84p
Contract NAS8-11155
NASA CR-68364

Descriptors: (*Panels (Structural), Shear stresses), (*Shear stresses, Panels (Structural).

N66-12979 Field 20I
CFSTI Prices: HC$3.00 MF$0.75
Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
ESTIMATES OF NONEQUILIBRIUM IONIZATION PHENOMENA IN THE INVISCID APOLLO PLASMA SHEATH,
by J. W. Daiber, M. G. Dunn, J. A. Lordi, and R. E. Mates. Sep 65, 64p CAL-A1-1972-A-1
Contract NAS5-3976
NASA CR-68309

Descriptors: (*Nonequilibrium flow, Ionization), (*Plasma sheath, Atmosphere entry), Reentry vehicles, Earth.

Identifiers: Apollo spacecraft.

N66-12988 Field 20H
CFSTI Prices: HC$3.00 MF$0.50
State Univ. of Iowa, Iowa City. Dept. of Physics and Astronomy.
OBSERVATIONS OF MAGNETOSPHERIC BOUNDARY PHENOMENA,
by L. A. Frank. Aug 65, 60p
Contract NONR-1509/06/, Grant NsG-233
NASA CR-68363
Prepared for Presentation at Advanced Study Inst. **Radiation Trapped in the Earth's Magnetic Field,** Bergen, Aug. 16 - Sep 3, 1965 ITS Rept.-65-32.

Descriptors: (*Terrestrial magnetism, Upper atmosphere), (*Space environmental conditions, Atmospheric sounding).

Identifiers: Explorer.

N66-12990 Field 20L
CFSTI Prices: HC$2.00 MF$0.50
Columbia Univ., New York.
FIELD ION MICROSCOPE INVESTIGATIONS OF SOLID SOLUTIONS.
Annual rept.,
by E. S. Machlin. 1 Jul 65, 36p
Grant NsG-294
NASA CR-68367

Descriptors: (*Solid solutions, Analysis), Platinum, Tungsten.

Identifiers: Ion microscope.

NCSC-2663-16 Field 20B, 13H
CFSTI Prices: HC$1.00 MF$0.50
North Carolina State Univ., Raleigh. Dept. of Engineering Research.
URANIUM INTERSTITIAL PHASES.
Quarterly rept for Mar 64,
by J. V. Hamme, R. F. Stoops, and G. S. Sheffield. 1964, 14p
Contract AT (40-1)-2663
EURAEC 1053

Descriptors: (*Crystal structure, Uranium), (*Uranium, Sintering).

ORNL-3895 Field 20H
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
ON THE BOUND STATES OF AN ELECTRON IN THE FIELD OF A PERMANENT ELECTRIC DIPOLE,
by J. H. Turner and Kenneth Fox. Dec 65, 50p
Contract W-7405-eng-26

Descriptors: (*Dipole moments, Quantum mechanics), (*Electrons, Dipole moments).

PB-169 190 Field 20I
CFSTI Prices: HC$2.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
NON-LINEAR MOTION OF TWO ION STREAMS IN A BACKGROUND OF HIGH TEMPERATURE ELECTRONS.
Research rept.,
by Tosiya Taniuti, Nobuo Yajima, and Akizi Outi. Oct 65, 27p IPPJ-41

Descriptors: (*Plasma medium, Shock waves), Ions, Electrons, Equations of motion, Stability, Plasma oscillations, Japan.

Non-linear ion acoustic waves propagating in a plasma of warm electrons and one or more streams of cold ions are investigated. A hydrodynamical model which employs ion fluid streams interacting among themselves through the electron pressure gradient is used, isothermal electrons are assumed. The present model shows how large amplitude disturbances become steeper, tending to form shocks or inversely how discontinuous initial disturbances are smoothed out. Simple waves are obtained by means of the method of characteristics: for the wave propagating faster than all the ions the compression leads to shock formation. The expansion to the instability, for the wave slower than all the ions the expansion leads to the shock formation and at the same time to instability. For the wave propagating with intermediate speed the situation is more complicated. (Author)

PB-169 191 Field 20I, 20C
CFSTI Prices: HC$1.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
NEGATIVE CONDUCTIVITY IN PARTIALLY IONIZED GASES.
Research rept.,
by Shigetoshi Tanaka, Tadao Honzawa, and Kazuo Takayama. Oct 65, 16p IPPJ-40

Descriptors: (*Plasma medium, Electrical con ductance), (*Electrical conductance, Plasma medium), Bremsstrahlung, Plasma oscillations, Stability, Radiofrequency amplifiers, Attenuation, Japan.

The amplification of radio-frequency signal was observed in partially ionized gases, having large Ramsauer effect, in the absence of magnetic field. A strong attenuation, an amplification of the applied rf signal, and strong emission with no input signal were observed. This phenomenon occurred when the working frequency was in the range from about 10 to 70.Mc/s, which was somewhat smaller than the collision frequency of plasma electrons. Experimental results are interpreted as a phenomenon of the negative conductivity due to bremsstrahlung in plasmas. (Author)

PB-169 192 **Field 20I**
CFSTI Prices: HC$2.00 MF$0.50
Institute of Plasma Physics, Nagoya Univ. (Japan).
ION CYCLOTRON RESONANCE HEATING OF AN INHOMOGENEOUS PLASMA COLUMN.
Research rept.,
by Masatoshi Tanaka. Sep 65, 34p IPPJ-37

Descriptors: (*Plasma medium, Heating), (*Cyclotron resonance phenomena, Plasma medium), Ions, Cyclotron waves, Plasma oscillations.

The ion cyclotron wave is generated in a plasma by an induction coil (Stix-type coil) wrapped around the plasma column. The absorbed rf power spectrum is estimated on the basis of the linearized VlasovMaxwell equations by taking into account of the variations of plasma density and ion temperature over the cross section of the plasma cylinder. Numerical calculations are made for the values of parameters of the QP plasma experiment assuming the density distribution of a parabolic type. (Author)

PB-169 232 **Field 20H**
CFSTI Prices: HC$4.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DES FLUCTUATIONS DES LARGEURS RADIATIVES PARTIELLES ET TOTALES PAR LA CAPTURE DES NEUTRONS DE RESONANCE (Study of the Fluctuations of the Partial and Total Radiative Widths by Neutron Capture Resonance Method.)
Doctoral thesis in French,
by Huynh Vinh Dinh. 18 Jun 65, 102p CEA-R-2810
Text in French; Attached summary in English.

Descriptors: (*Neutron capture, Nuclear resonance), Gamma-neutron reactions, Gamma-ray spectra, France.

Radiative capture experiments by neutron time-offlight methods have been made for following studies: distribution of partial radiative widths, effects of correlation between different radiative transitions, fluctuations of total radiative widths G from resonance to resonance, variation of G with number of mass and the search for the existence of potential capture. Also, some other experiments with the use of neutron capture gamma-rays spectra have been investigated. (Author)

PB-169 234 **Field 20G**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Grenoble (France). Centre d'Etudes Nucleaires.
RECHERCHE D'UNE INTENSE SOURCE DE PROTONS PULSEE A LA MICRO-SECONDE (Production of an Intense Source of Micro-Second Proton Pulses.)
Doctoral thesis in French,
by Jean-Loup Belmont. 22 Feb 65, 64p CEA-R-2802
Text in French; Attached summary in English.

Descriptors: (*Proton beams, Ion sources), Protons, Sources, Thyratrons, France.

In order to obtain micro-second proton pulses of 100 mA, we have built a duoplasmatron ion source and beam focusing equipment. The pulses of the ionsource were produced by a load discharge. The source operates as a hydrogen-thyratron. The particular geometry of the duoplasmatron was chosen in order that the ion emission be stable with a 10 A arc and with a gas-flow lower than 10 cc/h T.P.N. Studies of the beam showed preponderance of protons and the presence of heavy ions. The beam density is higher on the optic axis. (Author)

TID-20387 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Texas Nuclear Corp., Austin.
ANGULAR DISTRIBUTION OF GAMMA-RAYS PRODUCED BY FAST NEUTRON INELASTIC SCATTERING IN FE,
by R. W. Benjamin, D. O. Nellis, I. L. Morgan andW. E. Tucker. 1959, 21p
Contract AT (40-1)-2791

Descriptors: (*Fast neutrons, Inelastic scattering), (*Neutron reactions, Gamma rays), Iron.

TID-21335 **Field 20G**
CFSTI Prices: HC$5.00 MF$1.00
Minnesota Univ., Minneapolis. Linear Accelerator Lab.
ANNUAL PROGRESS REPORT ON LINEAR ACCELERATOR RESEARCH, DECEMBER 1963JULY 1964.
Sep 64, 171p
Contract AT (11-1)-50

Descriptors: (*Linear accelerators, Protons), (*Proton scattering, Linear accelerators).

WASH-1064 **Field 20H, 18K**
CFSTI Prices: HC$6.00 MF$1.25
AEC, Washington, D. C. Nuclear Cross Sections Advisory Group.
REPORTS TO THE AEC NUCLEAR CROSS SECTIONS ADVISORY GROUP AT DUKE UNIVERSITY, OCTOBER 13-14, 1965,
by H. T. Motz. 221p (EANDC)US79

Descriptors: (*Nuclear cross sections, Symposia), Measurement.

21. PROPULSION AND FUELS

AD-450 629 **Field 21F**
CFSTI Price: HC$1.00
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
NUCLEAR PULSE PROPULSION,
by J. C. Nance. 5 Oct 64, 19p GA-5572
Contract AF29 (601)-6214
Prepared for presentation at the Nuclear Science Symposium (11th), of the Inst. of Electrical and Electronics Engineers (IEEE), 28-30 Oct 64.

Descriptors: (*Nuclear explosions, Rocket propulsion), (*Rocket propulsion, Nuclear explosions), (*Nuclear propulsion feasibility studies), Spacecraft, Propellants, Radiation hazards, Ablation, Velocity, Rocket motors, Plasma engines.

ANL-7092 **Field 21F, 18L**
CFSTI Prices: HC$3.00 MF$0.75
Argonne National Lab., Ill.
CATALOG OF NUCLEAR REACTOR CONCEPTS. PART I. HOMOGENEOUS AND QUASI-HOMOGENEOUS REACTORS. SECTION III. REACTORS FUELED WITH MOLTEN-SALT SOLUTIONS,
by Charles E. Tester, James A. Locky, andJohn H. Mariens. Sep 65, 59p
Contract W-31-109-eng-38

Descriptors: (*Homogeneous reactors, Reactor fuels), (*Reactor fuels, Homogeneous reactors).

N66-10614 **Field 21I**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Dept. of Engineering Mechanics.
STRESS-STRAIN BEHAVIOR OF AN INERT COMPOSITE PROPELLANT FOR MULTIAXIAL LOADING CONDITIONS,
by Y. S. Lee and M. G. Sharma. Aug 65, 42p
Technical rept. no. 2
Contract NAS7-100
NASA CR-67809
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-950875.

Descriptors: (*Propellants, Stresses).

N66-10636 **Field 21H**
CFSTI Prices: HC$5.00 MF$1.25
Space-General Corp., El Monte, Calif.
STUDY OF SELECTED THRUST VECTOR CONTROL SYSTEMS FOR SOLID PROPELLANT MOTORS.
Final rept., 2 Jun-2 Aug 65.
Aug 65, 182p SGC-884-FR-1
Contract NAS7-100
NASA CR-67659
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-951189.

Descriptors: (*Rocket motors, Control systems), Propellants, Thrust vector control systems.

N66-10650 **Field 21H**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
GENERANT CONTROLLER DEVELOPMENT FOR THE ADVANCED LIQUID PROPULSION SYSTEM/ALPS/,
by W. F. MacGlashaw. 15 Nov 65, 35p JPL-TR-32-814
Contract NAS7-100
NASA CR-67842

Descriptors: (*Gas generator engines, Propulsion).

Identifiers: ALPS.

N66-10671 **Field 21H**
CFSTI Prices: HC$3.00 MF$0.75
Allied Research Associates, Inc., Concord, Mass.
A PHOTOMECHANICAL INVESTIGATION OF THE ALGOL SOLID PROPELLANT ROCKET MOTOR NOZZLE.
Final rept.,
by H. Becker and H. Hamilton. May 65, 84p ARA-F-274-8
Contract NAS1-3975
NASA CR-66026

Descriptors: (*Rocket motor nozzles, Stresses).

Identifiers: ALGOL.

N66-10689 **Field 21H**
CFSTI Prices: HC$5.00 MF$1.00
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
CALCULATION OF ROCKET PERFORMANCE PARAMETERS BASED ON THE EQUILIBRIUM COMPOSITION OF THE COMBUSTION PRODUCTS,
by K. W. Gross. 27 Aug 65, 173p NASA-TM-X-53334

Descriptors: (*Rocket motors, Performance (Engineering), (*Combustion products, Rocket motors).

N66-11244 **Field 21H**
CFSTI Prices: HC$3.00 MF$0.50
General Dynamics/Astronautics, San Diego, Calif.
CAPACITANCE MASS SENSING OF BOILING PROPELLANTS,
by C. K. Perkins and R. D. Wilburn. Jan 64, 51p

NASA CR-54799

Descriptors: (*Propellants, Boiling).

Identifiers: Centaur launch vehicle.

N66-11619 **Field 21H**
CFSTI Prices: HC$4.00 MF$1.00
Research Labs. Div., Bendix Corp., Southfield, Mich.
DEVELOPMENT OF AN ALL-FLUID AMPLIFIER FOR LIQUID ROCKET APPLICATIONS.
Final rept.,
by J. T. Kasselmann and J. G. Rivard. Nov 65, 140p BC/RLD-3015
Contract NAS3-4198
NASA CR-54446

Descriptors: (*Rocket motors, Thrust vector control systems), Amplifiers, Liquid rocket propellants.

N66-12139 **Field 21F**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF THE EFFECT OF A SEEDED PROPELLANT LAYER ON THERMAL RADIATION IN THE NOZZLE OF A GASEOUS-CORE NUCLEAR PROPULSION SYSTEM,
by J. R. Howell and H. E. Renkel. Dec 65, 18p
NASA-TN-D-3119

Descriptors: (*Nuclear propulsion, Nozzles), (*Nozzles, Thermal radiation).

N66-12146 **Field 21H**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INVESTIGATION OF THE STARTING CHARACTERISTIC OF THE M-1 ROCKET ENGINE USING THE ANALOG COMPUTER,
by R. J. Baumbick, J. R. Szuch, and L. M. Wenzel. Dec 65, 45p NASA-TN-D-3136

Descriptors: (*Rocket motors, Starting), (*Analog computers, Simulation).

Identifiers: M-1 rocket motor.

N66-12874 **Field 21H**
CFSTI Prices: HC$5.00 MF$1.00
Marquardt Corp., Van Nuys, Calif.
REFRACTORY THRUST CHAMBERS FOR SPACECRAFT ENGINES.
Final rept.,
by J. G. Campbell and C. D. Coulbert. 22 Mar 65, 156p
Contract NAS7-262
NASA CR-68183

Descriptors: (*Rocket motors, Liquid rocket propellants), (*Combustion chambers, Graphite), Thrust, Reliability.

N66-13000 **Field 21C**
CFSTI Prices: HC$4.00 MF$1.00
Hughes Aircraft Co., El Segundo, Calif. Space Systems Div.
SOLAR-POWERED ELECTRIC PROPULSION SPACECRAFT.
Bimonthly rept. no. 3, Jul - Aug 65,
by R. H. Stivers. Sep 65, 149p
Contract NAS7-100
NASA CR-68374
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-951144.

Descriptors: (*Spacecraft, Propulsion), (*Electric propulsion, Spacecraft).

22. SPACE TECHNOLOGY

AD-441 930 **Field 22C, 20D**
CFSTI Price: HC$3.00
General Dynamics/Astronautics, San Diego, Calif. Space Science Lab.
RE-ENTRY PHYSICS RESEARCH.
Semi-annual rept.
Jun 64, 70p GDA-DBE64-034
Contract DA-04-495-ORD-3383 (Z), ARPA Order-393,
Proj. DEFENDER

Descriptors: (*Atmosphere entry, Fluid dynamic properties), Shock tubes, Carbon dioxide, Oxygen, Hydrogen, Oxidation, Wake, Light gas guns, Relaxation time, Kerr cells, Photomultipliers, High-speed photography.

Identifiers: DEFENDER Project.

Contents: Three-inch shock tube program summary; induction period preceding CO2-formation in shock heated CO-O2-argon mixtures; influence of H2 on the induction period preceding CO2-formation in shock heated CO-O2-argon-mixtures; review of literature on CO-oxidation; computer code for chemically reacting, shock heated mixtures; microwave wake interaction studies; fluid dynamics; hypervelocity wake temperature measurements; 8-mm light gas gun range; 24-inch shock tube.

N66-10226 **Field 22B**
CFSTI Prices: HC$4.25 MF$3.50
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RELAY I PROGRAM.
Final rept.
1965, 749p
NASA SP-76

Descriptors: (*Communication satellites (Active), Radiation damage), (*Van Allen radiation belt, particles).

Identifiers: Relay I.

N66-10340 **Field 22C**
CFSTI Prices: HC$7.00 MF$1.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SPACE PROGRAMS SUMMARY NO. 37-34, VOLUME IV FOR THE PERIOD JUNE 1, 1965 TO JULY 31, 1965. SUPPORTING RESEARCH AND ADVANCED DEVELOPMENT.
31 Aug 65, 312p JPL-SPS-37-34, Vol. 4
Contract NAS7-100
NASA CR-67637

Descriptors: (*Space, Research programs administra tion), Guidance, Control, Propulsion, Systems engineer ing, Mechanics.

N66-10610 **Field 22D**
CFSTI Prices: HC$5.00 MF$1.25
Brown Engineering Co., Inc., Huntsville, Ala. Research Labs.
ASCENT AND DESCENT ABORT FLIGHT CORRIDORS FOR ORBITAL TRANSPORT VEHICLES,
by J. W. Daniel and J. L. Diven. Mar 65, 194p R-142
Contract NAS-8-5289
NASA CR-67789

Descriptors: (*Orbital trajectories, Abort).

N66-10612 **Field 22B**
CFSTI Prices: HC$6.00 MF$1.25
General Electric Co., Philadelphia, Pa. Missile and Space Div.
ELECTRICALLY-PROPELLED CARGO VEHICLE FOR SUSTAINED LUNAR SUPPLY OPERATIONS.
Final rept.,
by J. W. Larson. 28 Jun 65, 235p GE-65SD4361
Contract NAS8-11207
NASA CR-67807

Descriptors: (*Interplanetary trajectories, Moon), (*Electric propulsion, Interplanetary trajectories).

Identifiers: Earth-moon shuttle vehicle.

N66-10617 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
VOYAGER PROJECT.
Progress rept., 16 Aug-15 Sep 65.
1 Oct 65, 35p VPPR-8
Contract NAS7-100
NASA CR-67869

Descriptors: (*Spacecraft, Test methods), (*Space capsules, Test methods).

Identifiers: Voyager project.

N66-10631 **Field 22B**
CFSTI Prices: HC$5.00 MF$1.00
Little (Arthur D.), Inc., Cambridge, Mass.
THERMAL SCALE MODELING OF THE MARINER IV SPACECRAFT.
Final rept.,
by F. Gabron and R. W. Johnson. 20 Aug 65, 173p JPL-950789
Contract NAS7-100
NASA CR-67762

Descriptors: (*Space probes, Environmental tests).

Identifiers: Mariner IV.

N66-10639 **Field 22B**
CFSTI Prices: HC$6.00 MF$1.25
Control Research Associates, College Park, Md.
ADVANCE RESEARCH ON CONTROL SYSTEMS FOR THE SATURN LAUNCH VEHICLE.
Final rept., Jan 64-May 65,
by D. C. Lewis and P. Mendelson. 31 May 65, 214p
Contract NAS8-11143
NASA CR-67628

Descriptors: (*Launch vehicles (Aerospace), Control systems).

Identifiers: Saturn launch vehicle.

N66-10640 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SURVEYOR PROJECT STATUS REPORT, 13 NOVEMBER 1964,

by L. S. Frankenstein. 13 Nov 64, 19p SPSR-64
Contract NAS7-100
NASA CR-67638

Descriptors: (*Spacecraft, Soft landings), (*Soft landings, Moon).

Identifiers: Atlas-Centaur launch vehicle, Centaur-Atlas launch vehicle, Surveyor project.

N66-10641 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SURVEYOR PROJECT STATUS REPORT, 27 NOVEMBER 1964,
by L. S. Frankenstein. 27 Nov 64, 21p SPSR-65
Contract NAS7-100
NASA CR-67640

Descriptors: (*Spacecraft, Television communication systems).

Identifiers: Surveyor project, T-21 spacecraft.

N66-10642 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SURVEYOR PROJECT STATUS REPORT, 8 JANAUARY 1965,
by L. S. Frankenstein. 1965, 21p
Contract NAS7-100
NASA CR-67641

Descriptors: (*Spacecraft, Test methods).

Identifiers: Surveyor project, SC-1 flight vehicle.

N66-10643 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SURVEYOR PROJECT STATUS REPORT, 5 FEBRUARY 1965,
by L. S. Frankenstein. 17 Feb 65, 23p SPSR-69
Contract NAS7-100
NASA CR-67639

Descriptors: (*Structures, Vibration), (*Test vehicles, Structures).

Identifiers: Surveyor project.

N66-10644 **Field 22B**
CFSTI Prices: HC$1.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
SURVEYOR PROJECT STATUS REPORT, 19 FEBRUARY 1965,
by L. S. Frankenstein. 25 Feb 65, 22p SPSR-70
Contract NAS7-100
NASA CR-67642

Descriptors: (*Spacecraft, Test methods), (*Structures, Vibration).

Identifiers: Surveyor project.

N66-10662 **Field 22C**
CFSTI Prices: HC$4.00 MF$1.00
Space Technology Labs., Inc., Redondo Beach, Calif.
CAPABILITY GUIDE- TRACKING ACCURACY PREDICTION PROGRAM / TAPP MOD I/,
by A. S. Liu. 1 Nov 62, 150p
Contract NAS7-100
NASA CR-67883
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, rept. no. JPL-950045.

Descriptors: (*Orbital trajectories, Flight paths), (*Flight paths, Statistical analysis), Tracking.

N66-10703 **Field 22A**
CFSTI Prices: HC$2.00 MF$0.50
Northrop Space Labs., Huntsville, Ala.
LUNAR DUST/DEBRIS HAZARDS ASSOCIATED WITH THE MANNED FLYING SYSTEM,
by L. M. Bhalla, H. W. Hsu, R. L. Stark, andF. B. Tatom. Oct 65, 34p
Contract NAS8-20082
NASA CR-61106

Descriptors: (*Dust, Hazards), (*Manned spacecraft, Moon), Flight.

N66-10713 **Field 22B**
CFSTI Prices: HC$5.00 MF$1.25
General Electric Co., Philadelphia, Pa. Missile and Space Div.
RESEARCH ON SPACECRAFT AND POWER-PLANT INTEGRATION PROBLEMS SPACECRAFT ANALYSIS.
Topical rept.,
by J. W. Larson. 1964, 193p 64SD892
Contract NAS3-2533
NASA CR-54159

Descriptors: (*Scientific satellites, Propulsion), Nuclear propulsion, Spacecraft, Power supplies.

N66-10750 **Field 22A**
CFSTI Price: MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
SPACE AND THE INTERNATIONAL COOPERATION YEAR - A NATIONAL CHALLENGE,
by A. W. Frutkin. 1965, 21p NASA-EP-30
Hardcopy available from Superintendent of Documents, G. P. O., Washington, D. C., 20402, $0.20.

Descriptors: (*Space, Research program administration).

N66-10755 **Field 22B, 14D, 12A, 15E**
CFSTI Prices: HC$2.00 MF$0.50
RAND Corp., Santa Monica, Calif.
OPTIMAL PROCEDURES FOR STOCHASTICALLY FAILING EQUIPMENT,
by J. Folkman and S. Port. Oct 65, 30p RM-4598-NASA
Contract NASR-21/11/
NASA CR-67689

Descriptors: (*Maintenance, Spacecraft), (*Spacecraft, Maintenance), Stochastic processes, Space maintenance.

N66-10801 **Field 22B, 22C**
CFSTI Prices: HC$4.00 MF$0.75
Space Technology Labs., Inc., Redondo Beach, Calif.
STUDY OF AN ABLE-MARS ENCOUNTER MISSION,
31 Aug 62, 101p
Contract NAS-246
NASA CR-67778

Descriptors: (*Spacecraft, Mars probes), Mars, Interplanetary trajectories.

N66-10880 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Washington, D. C.
THE NATION'S MANNED SPACE FLIGHTS,
by H. L. Dryden. 1965, 19p NASA-TM-X-56879

Descriptors: (*Space flight, History), (*History, Space flight).

N66-10885 **Field 22B, 20N**
CFSTI Prices: HC$5.00 MF$1.00
General Electric Co., Philadelphia, Pa. Missile and Space Div.
R F TRANSPARENT, ENERGY ABSORBING, STRUCTURAL ELEMENTS, PHASE II.
Final rept. 5 Jun 63-16 Mar 64,
by H. G. Lorsch and W. M. Meyers. 17 Aug 64, 177p
Contract NAS7-100
NASA CR-67776
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Rept. no. JPL-950 564.

Descriptors: (*Structural parts, Spacecraft), (*Absorption, Structural parts), Energy, Shielding, Dielectric properties.

N66-10887 **Field 22A, 22B**
CFSTI Prices: HC$8.00 MF$2.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
STUDY OF MARS AND VENUS ORBITER MISSIONS LAUNCHED BY THE 3-STAGE SATURN C-1 B VEHICLE, VOLUME III,
by W. E. Arens. 31 Dec 63, 522p EPD-139, Vol. III
Contract NAS7-100
NASA CR-67606

Descriptors: (*Mars probes, Space capsules), (*Venus probes, Space capsules), Launch vehicles (Aerospace), Orbital trajectories, Soft landings.

Identifiers: Saturn (Booster).

N66-11211 **Field 22A**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center.
LUNAR SCIENTIFIC OPERATIONS,
by D. A. Beattie and P. D. Lowman, Jr. Jul 65, 21p NASA-TM-X-55315, X-641-65-292
Prepared for presentation at The Meeting of the Am. Astron. Soc., N. Y., (10th) May 4-7 1964.

Descriptors: (*Manned spacecraft, Moon), (*Moon, Exploration), Launch vehicles (Aerospace).

Identifiers: Apollo project.

N66-11227 **Field 22B**
CFSTI Prices: HC$3.00 MF$0.75
National Aeronautics and Space Administration. Greenbelt, Md. Goddard Space Flight Center.
THE METEOROLOGICAL INSTRUMENTATION OF SATELLITES,
by H. I. Butler and H. S. Moore. Sep 65, 73p NASA-TM-X-55332, X-480-65-368
Prepared in cooperation with Environmental Science Services Admin., Wash. D. C.

Descriptors: (*Meteorological satellites, Optical equipment), Weather forecasting, Numerical analysis.

Identifiers: TIROS, Nimbus.

N66-11240 **Field 22D**
CFSTI Prices: HC$4.00 MF$0.75
General Dynamics/Convair, San Diego, Calif.
ATLAS/CENTAUR LAUNCH-ON-TIME STUDY.
Final rept. for surveyor mission.
7 Jul 65, 108p GD/C-ACY-65-001-4
Contract NAS3-3228
NASA CR-54804

Descriptors: (*Launch vehicles (Aerospace), Tests).

Identifiers: Atlas - Centaur launch vehicle, Centaur - Atlas launch vehicle, Surveyor project.

N66-11671 **Field 22D**
CFSTI Prices: HC$3.00 MF$0.75
Astro-Electronics Div., Radio Corp. of America, Princeton, N. J.
USER GUIDE FOR HRIR MODIFICATIONS TO THE APTS GROUND STATIONS.
23 Nov 65, 79p AED-M2059
Contract NAS5-667
NASA CR-68037

Descriptors: (*Signals, Processing), (*Infrared pulses, Processing), Automatic.

Identifiers: APT (Automatic picture transmission).

N66-11876 **Field 22A**
CFSTI Prices: HC$5.00 MF$1.00
Grumman Aircraft Engineering Corp., Bethpage, N. Y. Research Dept.
PHOTOMETRIC MEASUREMENTS OF SIMULATED LUNAR SURFACES,
by J. D. Halajian. Jul 65, 180p RE-219
Contract NAS9-3182
NASA CR-65169

Descriptors: (*Lunar environment, Photometry), Rock, Albedo (Astronomy).

N66-12611 **Field 22D, 13G**
CFSTI Prices: HC$8.45 MF$2.25
Martin Co., Denver, Colo.
OPTIMIZATION OF HYDRAULIC THRUST VECTOR CONTROL SYSTEMS FOR LAUNCH VEHICLES, VOLUME III, SECTION 2,
by C. E. Jones. Jan 65, 445p CR-65-5, vol. 3, sect. 2
Contract NAS8-11415
NASA CR-68093

Descriptors: (*Thrust vector control systems, Launch vehicles (Aerospace)), (*Launch vehicles (Aerospace), Thrust vector control systems), Optimization, Hydraulic systems, Control systems.

N66-12868 **Field 22B, 10B, 14D**
CFSTI Prices: HC$1.00 MF$0.50
Planning Research Corp., Los Angeles, Calif.
RELIABILITY ASSESSMENT OF THE GEOS A POWER SUPPLY,
by C. E. Bloomquist and D. B. Levinson. 11 Oct 65, 22p PRC-D-1110
Contract NASw-1180
NASA CR-68184

Descriptors: (*Scientific satellites, Geodesics), (*Power supplies, Scientific satellites), Reliability.

N66-13023 **Field 22A**
CFSTI Prices: HC$4.00 MF$0.75
Whittaker Corp., San Diego, Calif.
RESEARCH ON AN EXPANDABLE AIRLOCK UTILIZING THE ELASTIC RECOVERY PRINCIPLE.
Final rept.,
by N. O. Brink. Dec 65, 101p
Contract NAS7-283
NASA CR-351

Descriptors: (*Locking fastener devices, Performance (Engineering).

Identifiers: Air lock.

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AD-459 593	16	AD-459 593
AD-459 663	16	AD-459 663
AD-460 373	20	AD-460 373
AD-462 339	5	AD-462 339
AD-465 928	4	AD-465 928
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AD-466 177	20	AD-466 177
AD-466 611	20	AD-466 611
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